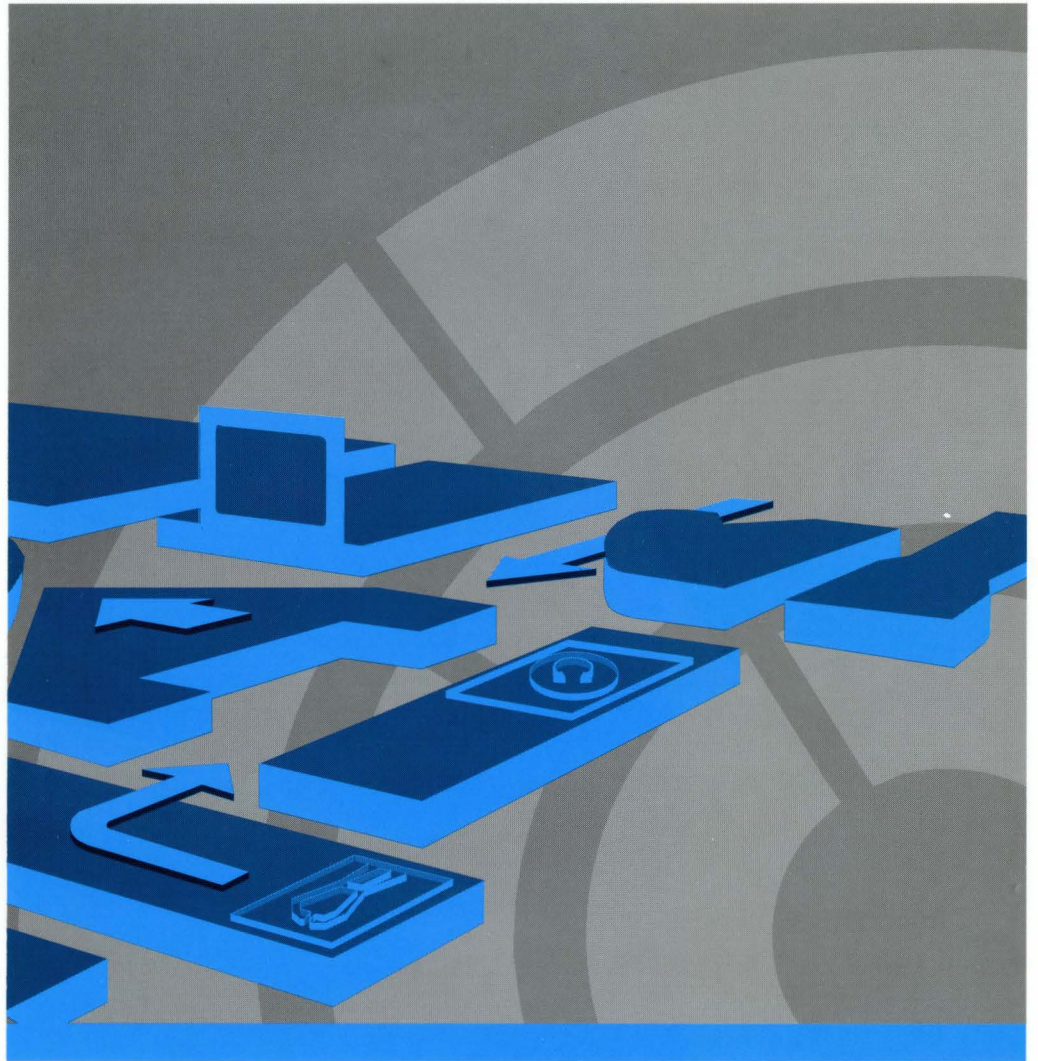


**7585 Industrial Computer Information:
Installation
Operation
Hardware Maintenance**

S06H-2298-00





**7585 Industrial Computer Information:
Installation
Operation
Hardware Maintenance**

S06H-2298-00

Important:

Before using this information and the product it supports, read the general information in "Notices" on page xv. Be sure to read the information in "Safety" on page xx, and if you are going to handle electronic components, you must also read "Handling Static-Sensitive Devices" on page I.

First Edition (August 1994)

The following paragraph does not apply to the United Kingdom or any country where such provisions are inconsistent with local law:

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This publication could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time.

It is possible that this publication may contain reference to, or information about, IBM products (machines and programs), programming, or services that are not announced in your country. Such references or information must not be construed to mean that IBM intends to announce such IBM products, programming, or services in your country.

THE PUBLICATION OF THE INFORMATION CONTAINED HEREIN IS NOT INTENDED TO AND DOES NOT CONVEY ANY RIGHTS OR LICENSES, EXPRESS OR IMPLIED, UNDER ANY IBM PATENTS, COPYRIGHTS, TRADEMARKS, MASK WORKS OR ANY OTHER INTELLECTUAL PROPERTY RIGHTS.

Publications are not stocked at the address below. Requests for copies of this publication and for technical information about IBM products should be made to your IBM Authorized Dealer or your IBM Marketing Representative.

The following paragraph applies only to the United States and Puerto Rico:

A *Reader's Comments* form was printed at the back of this manual. If it has been removed, you may address comments to:

International Business Machines Corporation
Information Development
Department 27X
P.O. Box 1328
Boca Raton, Florida 33429-1328

When you send information to IBM, you grant IBM a nonexclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

© Copyright International Business Machines Corporation 1994. All rights reserved.

Note to U.S. Government Users — Documentation related to restricted rights — Use, duplication or disclosure is subject to restrictions set forth in GSA ADP Schedule Contract with IBM Corp.

NOTICE TO CUSTOMERS

IBM System Programs License Agreement

BEFORE OPENING THIS PACKAGE OR USING YOUR SYSTEM, YOU SHOULD READ THE FOLLOWING TERMS AND CONDITIONS. OPENING THIS PACKAGE OR INITIAL USE OF THE SYSTEM PROGRAMS INDICATES YOUR ACCEPTANCE OF THESE TERMS AND CONDITIONS.

License: This is a license agreement ("Agreement") for IBM system programs ("Programs") which are provided on the enclosed IBM diskette(s), or may be recorded on other media included in this package, or on an IBM system ("System"). A System includes IBM machines, features, conversions, upgrades, and options, either separately or in any combination.

IBM may also include other programs in this package which may be licensed under different terms and conditions. Please refer to the license agreement(s) accompanying such other programs for the terms and conditions governing their use.

International Business Machines Corporation ("IBM") owns or has rights to the Programs which are protected by copyright and licensed, not sold. If you are a rightful possessor of a System, or if you have obtained Programs for the purpose of maintaining a System, IBM, or the applicable IBM country organization, grants you a license to use the Programs as part of or in conjunction with a System, or to restore and maintain the Programs. You obtain no rights other than those granted to you under this license. IBM retains title to the Programs and all copies you make of them.

YOU MUST REPRODUCE THE IBM COPYRIGHT NOTICE AND ANY LEGENDS ON EACH COPY OF A PROGRAM YOU CREATE.

This license authorizes you to:

1. use the Programs as part of, or in conjunction with, a System as specified in the IBM documentation;
2. modify or adapt only the SETUP and ADAPTER DESCRIPTION FILES (@XXXX.ADF), if applicable, to enable a System to operate in accordance with IBM's Official Published Specifications;
3. copy the Programs for backup, or archival purposes;
4. make copies of the Programs and distribute them to a rightful possessor of a System and to install the Programs for a rightful possessor (but only to the extent necessary to restore or maintain the System), provided that you supply such party a copy of this Agreement. Initial use of the Programs by such party shall indicate acceptance of this Agreement; and
5. transfer possession of these Programs and diskette(s) to another party in conjunction with the transfer of a System, provided that you supply a copy of this Agreement to such party. Initial use of these Programs by such party shall indicate acceptance of this Agreement. Such transfer of possession of the Programs shall terminate your license from IBM, and you must, at the same time, either transfer to such party or destroy all your other copies of the Programs.

You may NOT:

1. use, merge, copy, display, adapt, modify, execute, distribute or transfer the Programs, except as authorized by this license;
2. reverse assemble, reverse compile, decode, or translate the Programs; or
3. sublicense, rent, lease, or assign Programs.

Warranty: IBM warrants the Programs in accordance with the Statement of Limited Warranty that accompanied your System, which is hereby incorporated by reference.

General: You may terminate your license at any time. IBM may terminate your license if you fail to comply with the terms and conditions of this Agreement. In either event, you must destroy all your copies of the Programs.

You are responsible for the payment of any taxes, including personal property taxes, resulting from this Agreement.

Neither party may bring an action, regardless of form, more than two years after the cause of action arose.

If you acquire the Programs in the United States, this license is governed by the laws of the State of New York. If you acquired the Programs in Canada, this license is governed by the laws of the Province of Ontario. Otherwise, this license is governed by the laws of the country in which you acquired the Programs.

Statement of Limited Warranty (Machine)

The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you originally purchase for your use, and not for resale, from IBM or an IBM authorized reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. Machines are subject to these terms only if purchased in the United States or Puerto Rico, or Canada, and located in the country of purchase. If you have any questions, contact IBM or your reseller.

Machine: IBM 7585 Industrial Computer

Warranty Period*: Three Years

**Elements and accessories are warranted for three months. Contact your place of purchase for warranty service information.*

Production Status: Each Machine is manufactured from new parts, or new and serviceable used parts (which perform like new parts). In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's warranty terms apply.

The IBM Warranty: IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications. IBM calculates the expiration of the warranty period from the Machine's Date of Installation. The date on your receipt is the Date of Installation, unless IBM or your reseller informs you otherwise.

During the warranty period, IBM or your reseller will provide warranty service under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine. IBM or your reseller will specify the type of service.

For a feature, conversion, or upgrade, IBM or your reseller may require that the Machine on which it is installed be 1) the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Some of these transactions (called "Net-Priced" transactions) may include additional parts and associated replacement parts that are provided on an exchange basis. All removed parts become the property of IBM and must be returned to IBM.

Replacement parts assume the remaining warranty of the parts they replace.

If a Machine does not function as warranted during the warranty period, IBM or your reseller will repair or replace it (with a Machine that is at least functionally equivalent) without charge. If IBM or your reseller is unable to do so, you may return it to your place of purchase and your money will be refunded.

If you transfer a Machine to another user, warranty service is available to that user for the remainder of the warranty period. You should give your proof of purchase and this Statement to that user.

Warranty Service: To obtain warranty service for the Machine, you should contact your reseller or call IBM. In the United States, call IBM at **1-800-IBM-SERV (426-7378)**. In Canada, call IBM at **1-800-465-6666**. You may be required to present proof of purchase.

Depending on the Machine, the service may be 1) a "Repair" service at your location (called "On-site") or at one of IBM's or a reseller's service locations (called "Carry-in") or 2) an "Exchange" service, either On-site or Carry-in.

When a type of service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced.

It is your responsibility to:

1. obtain authorization from the owner (for example, your lessor) to have IBM or your reseller service a Machine that you do not own;
2. where applicable, before service is provided —
 - a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provide,
 - b. secure all programs, data, and funds contained in a Machine,
 - c. inform IBM or your reseller of changes in a Machine's location, and
 - d. for a Machine with exchange service, remove all features, parts, options, alterations, and attachments not under warranty service. Also, the Machine must be free of any legal obligations or restrictions that prevent its exchange; and
3. be responsible for loss of, or damage to, a Machine in transit when you are responsible for the transportation charges.

Extent of Warranty: IBM does not warrant uninterrupted or error-free operation of a Machine.

Misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible may void the warranties.

THESE WARRANTIES REPLACE ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. HOWEVER, SOME LAWS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES. IF THESE LAWS APPLY, THEN ALL EXPRESS AND IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

In Canada, warranties include both warranties and conditions.

Some jurisdictions do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

Limitation of Liability: Circumstances may arise where, because of a default on IBM's part (including fundamental breach) or other liability (including negligence and misrepresentation), you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages, IBM is liable only for:

1. bodily injury (including death), and damage to real property and tangible personal property; and
2. the amount of any other actual loss or damage, up to the greater of \$100,000 or the charge for the Machine that is the subject of the claim.

Under no circumstances is IBM liable for any of the following:

1. third-party claims against you for losses or damages (other than those under the first item listed above);
2. loss of, or damage to, your records or data; or
3. economic consequential damages (including lost profits or savings) or incidental damages, even if IBM is informed of their possibility.

Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction.

Contents

IBM System Programs License Agreement	iii
Statement of Limited Warranty (Machine)	v
Notices	xv
Internal Fuse	xv
Trademarks and Service Marks	xvi
Required Electronic Emission and Connectivity Notices	xvii
Class A Federal Communications Commission Statement	xvii
Canadian Department of Communications Compliance Statement	xvii
United Kingdom	xviii
Germany	xviii
Japan	xviii
Korea	xix
Safety	xx
Caution Statements	xx
Varoitukset	xxii
Hinweise ACHTUNG	xxiv
Disposizioni per la sicurezza	xxvi
Instructies "Let op !"	xxviii
Säkerhetsinformation	xxx
Informações Sobre Segurança	xxxii
Instruções de Segurança	xxxiv
Consignes de sécurité électrique	xxxvi
Sikkerhedsforskrifter mærket 'Pas på!'	xxxviii
Advarsler	xl
Avisos de Precaución	xlii
Consignes de sécurité électrique	xliv
Lithium Battery Notice	xlvii
Handling Static-Sensitive Devices	I
Preface	li
Related Publications	lii

Part 1. User Information

Chapter 1. Overview of the 7585 Industrial Computer	1-1
General Description of Features	1-1
General Layout of Components	1-2
System Board Features	1-6
Specifications	1-7
Physical	1-7
Power Supply	1-7
Heat Output	1-7
Environment	1-7
Option Overview	1-9
RAM Memory	1-9
Cache Memory	1-9
Video Memory	1-9
Microprocessor	1-9

Adapters	1-9
Drives	1-9
Drive Sizes and Mountings	1-10
Cover Plates (Bezels)	1-10
Cables	1-10
Integrated Drive Electronics (IDE) Controller	1-10
Small Computer System Interface (SCSI) Drives	1-10
Keyboard	1-13
Pointing Devices	1-13
Parallel Devices	1-13
Serial Devices	1-13
Displays	1-14
Chapter 2. Installing Your Computer	2-1
Before You Begin:	2-1
Step 1. Unpack Your Computer	2-1
Step 2. Check the Voltage Setting	2-2
Step 3. Install Internal Options	2-3
Step 4. Mount the Computer	2-4
Free-Standing	2-4
Rack-Mount Setup with Slide Rails	2-5
Rack-Mount Setup without Slide Rails	2-6
Step 5. Connect the Cables	2-7
Step 6. Power-Up the Computer System and Check It Out	2-8
Step 7. Run the Configuration Utility	2-9
Step 8. Finish the Installation	2-10
Chapter 3. Installing Options	3-1
Switching Off Power and Disconnecting Cables	3-4
Removing the System Unit from its Mounting	3-5
Removing the System Unit from a Rack	3-5
Opening the System Unit	3-5
RAM Memory Modules (SIMMs)	3-6
Cache Memory Modules	3-8
Video Memory Modules	3-10
Adapters	3-11
Internal Drives	3-12
Chapter 4. Operating Instructions	4-1
Controls	4-1
Front Access Door	4-1
Power Switch	4-1
Light-Emitting Diodes (LEDs)	4-1
Power Supply	4-2
Prior to Initial Power-Up	4-2
Starting Up Your System	4-2
Installing an Operating System	4-4
Installing Application Programs	4-4
Air Filters	4-4
Security Features	4-5
Front Access Lock and Keys	4-5
Diskette Write-Protect Jumper	4-5
Serial and Parallel Port I/O Control	4-5
Passwords	4-5

Power-On Password	4-5
System Administrator Password	4-6
Removing a Power-on Password or System Administrator Password	4-6
Keyboard Password	4-6
Startup Sequence Control	4-6
Unattended Start Mode	4-6
Keyboardless Operation Mode	4-7
Power Management Program	4-7
Chapter 5. Problem Solving	5-1
Diagnostic Tools	5-2
Power-On Self-Test (POST)	5-2
The Configuration Utility Program	5-3
The Diagnostic Programs	5-3
Troubleshooting Charts	5-3
Error Messages	5-3
Testing the Computer	5-4
Starting the Computer	5-4
Starting the Diskette-Based Diagnostic Program	5-5
Troubleshooting Charts	5-6
Error Messages	5-13
POST Messages	5-13
Diagnostic Messages	5-17

Part 2. Hardware Maintenance Information

Chapter 6. Service Diagnostic Information	6-1
Before Replacing a System Board	6-2
FRU Isolation for 486DX4 System Boards	6-2
General Checkout	6-3
Undetermined Problem	6-6
Display	6-7
Installed Devices List	6-8
Single In-Line Memory Modules (SIMMs)	6-9
Memory Test	6-10
Symptom-to-FRU Index	6-11
Beep Code Index	6-12
Symptom/Error Index	6-12
Diagnostics and Test Information	6-17
Power-On Self Test (POST)	6-17
Diagnostics Diskette	6-17
To load the diagnostics diskette:	6-18
Diagnostic Menus	6-18
Diagnostic Diskette Main Menu	6-18
System Checkout	6-19
Diagnostic Test Select Menu	6-19
Diskette Test Select Menu	6-20
Hard Disk Drive Test Select Menu	6-20
Formatting a Hard Disk Drive	6-21
Formatting Procedure	6-21
Video Test Select Menu	6-22
Error Log	6-23
Creating the Error Log	6-23

Starting the Test	6-23
Displaying the Error Log	6-23
Keyboard	6-24
Printer	6-25
Power Supply	6-25
Chapter 7. Removal and Replacement Procedures	7-1
Switching Off Power and Disconnecting Cables	7-6
Removing the System Unit from its Mounting	7-7
Removing the System Unit from a Rack	7-7
Opening the System Unit	7-7
Feature Cards	7-8
Memory Retention Battery	7-9
RAM Memory Modules (SIMMs)	7-10
Cache Memory Modules	7-11
Video Memory Module	7-12
Microprocessor	7-13
Riser Card	7-14
System Board	7-15
Diskette Drive	7-17
Hard Disk Drive	7-18
CD ROM Drive	7-19
Power Supply	7-20
Front Fan	7-21
Rear Fan	7-22
LED Assembly	7-23
Power Switch	7-24
Speaker	7-25
Chapter 8. Parts Catalog	8-1
IBM Service Parts Warranty	8-1
Covers	8-2
Chassis	8-3
Fans, Power Supply, and Speaker	8-4
Air Filters, LEDs, and On/Off Switch	8-5
Diskette Drive and Mounting	8-6
Hard Disk Drive and Mounting	8-7
CD-ROM Drive and Mounting	8-8
System Board Components	8-9
Rackmount Plates and Handles	8-10
Keyboards	8-11
Power Cords	8-12

Part 3. Appendixes

Appendix A. System Records	A-1
Appendix B. 7585 Industrial Computer Physical Dimensions	B-1
Appendix C. Jumpers	C-1
Changing Jumper Positions	C-1
Jumper Descriptions	C-2

Appendix D. Interrupt and DMA Assignments	D-1
Interrupt Request Assignments	D-1
DMA Channel Assignments	D-2
Appendix E. S3 Vision864 SVGA Device Drivers Installation Instructions	E-1
Introduction to Device Drivers	E-2
Change the Refresh Rate	E-3
Refresh from AUTOEXEC.BAT	E-4
Refresh in Graphical Mode	E-5
Refresh From the Command Line	E-6
Microsoft Windows Version 3.1 Drivers	E-7
Installation	E-7
Updating the Device Drivers	E-8
DOS Drivers / Utilities	E-9
DataCAD Version 4.06 Installation	E-9
CADVANCE Version 3.51 Installation	E-11
Generic CADD Version 6.0 Installation	E-12
AutoDesk ADI Version 4.2 Installation	E-13
AutoCAD Release 11 Configuration	E-14
AutoCAD Release 12 Configuration	E-15
AutoShade Version 2.1 Configuration	E-17
3D Studio Version 1.0 Configuration	E-18
3D Studio Version 2.0 Configuration	E-19
MicroStation PC (Protected Mode) Version 4.0 Installation	E-20
MicroStation PC (Protected Mode) Version 5.0 Installation	E-21
LOTUS 1-2-3 Version 2.3 Installation	E-22
Microsoft Word Version 5.0 Installation	E-23
Index	X-1

Figures

1-1.	IBM 7585 Industrial Computer	1-1
1-2.	General component layout	1-2
1-3.	System board component locations	1-4
1-4.	Chained SCSI devices, each with a unique ID	1-11
1-5.	SCSI terminators	1-11
3-1.	System board component locations	3-2
3-2.	Diskette drive installation	3-14
3-3.	CD-ROM drive installation	3-15
3-4.	Hard disk drive installation	3-16
4-1.	Power switch and LEDs	4-1
6-1.	Voltage regulator probe points on 486DX4 FRU	6-2
6-2.	Keyboard connector voltages	6-24
6-3.	Power supply connector voltages	6-25
7-1.	General component layout	7-2
7-2.	System board component locations	7-4
8-1.	Covers	8-2
8-2.	Chassis	8-3
8-3.	Fans, power supply, and speaker	8-4
8-4.	Air filters, LEDs, and on/off switch	8-5
8-5.	Diskette drive and mounting	8-6
8-6.	Hard drive and mounting	8-7
8-7.	CD-ROM drive and mounting	8-8
8-8.	System board components	8-9
8-9.	Rackmount plates and handles	8-10
B-1.	Front and bottom dimensions	B-1
B-2.	Side dimensions	B-2
B-3.	Rackmount front plate dimensions (without slide rails)	B-3
B-4.	Rackmount front plate dimensions (with slide rails)	B-3

Notices

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program, or service is not intended to state or imply that only IBM's product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any of IBM's intellectual property rights may be used instead of the IBM product, program, or service. Evaluation and verification of operation in conjunction with other products, except those expressly designated by IBM, is the user's responsibility.

IBM may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Corporation
IBM Director of Licensing
208 Harbor Drive
Stamford, Connecticut
United States 06904

Internal Fuse

Internal fuse F3 is located on the system board.

Fuse F3 — UL/CSA 5A, 125 Volt FB

Trademarks and Service Marks

The following terms, **which are denoted by an asterisk (*) in this publication**, are trademarks or service marks of IBM Corporation in the United States and/or other countries:

IBM
AT
PS/ValuePoint
ValuePoint
Operating System/2
OS/2

The following terms, **which are denoted by a double asterisk (**) in this publication**, are trademarks of other companies as follows:

1-2-3	Lotus Development Corporation
ADI	AutoDesk, Inc.
AutoCAD	AutoDesk, Inc.
AutoDesk	AutoDesk, Inc.
AutoShade	AutoDesk, Inc.
Band-Free	ATC Graphics Company
CADVANCE	Isicad GmbH
DataCAD	Cadkey, Inc.
Generic CADD	Generic Software, Inc.
Lotus	Lotus Development Corporation
Microsoft	Microsoft Corporation
Microsoft Word	Microsoft Corporation
MicroStation	Bentley Systems, Inc.
Paging Alarm	ATC Graphics Company
RenderMan	AutoDesk, Inc.
S3	S3 Incorporated
VESA	Video Electronics Standards Association
Vision864	S3 Incorporated
3D Studio	AutoDesk, Inc.
Windows	Microsoft Corporation

Required Electronic Emission and Connectivity Notices

Class A Federal Communications Commission Statement

The following statement applies to this IBM product. The statement for other IBM products intended for use with this product will appear in their accompanying manuals.

Federal Communications Commission (FCC) Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

IBM is not responsible for any radio or television interference caused by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Canadian Department of Communications Compliance Statement

This equipment does not exceed Class A limits per radio noise emissions for digital apparatus, set out in the Radio Interference Regulation of the Canadian Department of Communications. Operation in a residential area may cause unacceptable interference to radio and TV reception requiring the owner or operator to take whatever steps are necessary to correct the interference.

Avis de conformité aux normes du ministère des Communications du Canada

Cet équipement ne dépasse pas les limites de Classe A d'émission de bruits radioélectriques pour les appareils numériques, telles que prescrites par le Règlement sur le brouillage radioélectrique établi par le ministère des Communications du Canada. L'exploitation faite en milieu résidentiel peut entraîner le brouillage des réceptions radio et télé, ce qui obligerait le propriétaire ou l'opérateur à prendre les dispositions nécessaires pour en éliminer les causes.

United Kingdom

UNITED KINGDOM TELECOMMUNICATIONS
SAFETY REQUIREMENTS
NOTICE TO CUSTOMERS

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunications systems in the United Kingdom.

Germany

IBM Industriecomputer

Was müssen Sie beim Anschluß des Industriecomputers an einen Modem der DBP Telekom beachten?

- Das **Zulassungszeichen** der Deutschen Bundespost (DBP).

Bringen Sie das beiliegende Schildchen mit der DBP Zulassungsnummer bitte auf der Rückseite des Industriecomputers (IC) an.

- Die **Allgemeine Anschalterlaubnis**.

Dieser IC erfüllt die Bedingungen der Absätze 2.1 bis 2.4 der BMPT Verfügung 163/1991 für die **Allgemeine Anschalterlaubnis** (AAE). Siehe beiliegenden Auszug aus Amtsblatt BMPT 51/91.

Bitte beachten Sie die übrigen Bestimmungen des Abschnittes 2, Verfügung 163/1991 des Bundesministeriums für Post und Telekommunikation (BMPT). Rückfragen dazu richten Sie an das BMPT.

Gegebenenfalls ist nach Abschnitt 3 der beiliegenden BMPT Verfügung 162/1991 zu verfahren.

Japan

この装置は、第一種情報装置（商工業地域において使用されるべき情報装置）で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（VCCI）基準に適合しております。

従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。

取扱説明書に従って正しい取り扱いをして下さい。

Korea

체신부 전자파장해검정규칙 사용자 안내문

이 기기는 업무용으로 전자파장해검정을 받은 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약 잘못 구입하였을 때에는 구입한 곳에서 비업무용으로 교환하시기 바랍니다.

Safety

Caution Statements

Electrical Safety

CAUTION:

Electrical current from power, telephone, and communication cables can be hazardous. To avoid any shock hazard, you should disconnect all power cords and cables as described in the following information.

For your safety, always do the following *before* removing the cover:

1. Turn off the computer and any attached devices, such as printers, displays, and external drives.

Note: Industrial computer users in the United Kingdom that have a modem or fax machine attached to their computer, must disconnect the telephone line from the computer *before* unplugging any power cords (also known as power cables). When reassembling your computer, reconnect the telephone line *after* you plug in the power cords.

2. Unplug all the power cords from electrical outlets.
3. Disconnect all communication cables from external receptacles.
4. Disconnect all cables and power cords from the back of the computer.

Note: Do not reconnect any cables or power cords until you reassemble the computer and put the cover back on.

CAUTION:

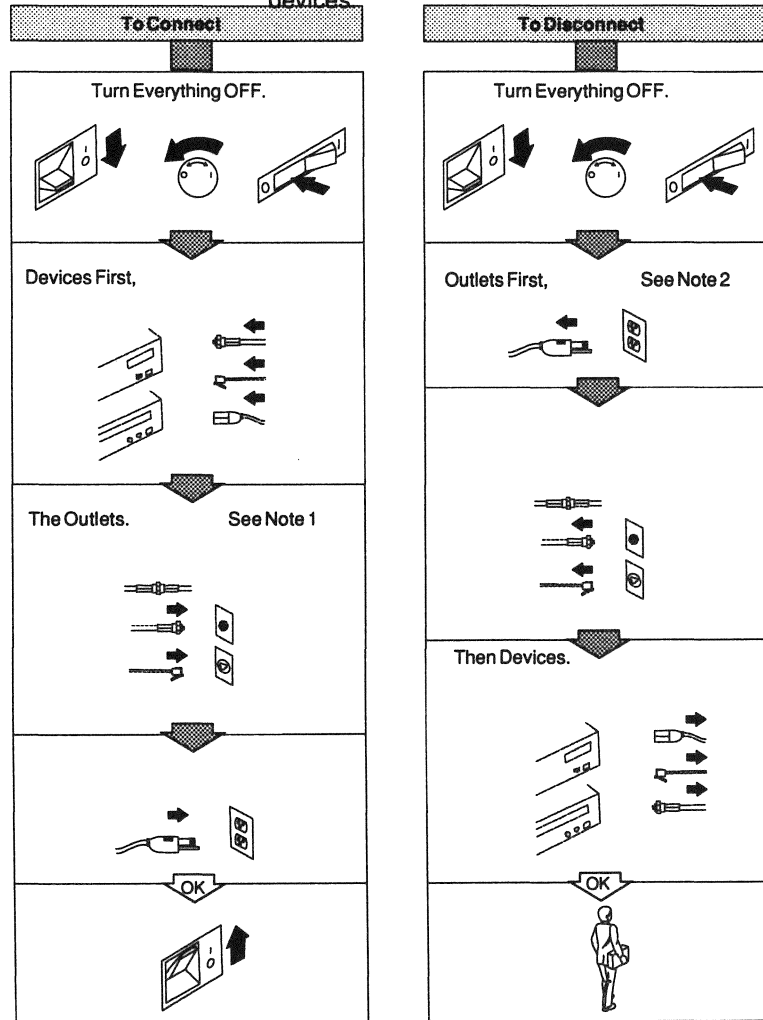
Never remove the cover on the power supply. If you have a problem with the power supply, have your computer serviced.

CAUTION:

The computer with options can weigh as much as 17 kilograms (37.8 pounds). Do not attempt to lift it by yourself if you think it is too heavy for you.



Electrical current from power, telephone, and communications cables is hazardous. To avoid shock hazard, connect and disconnect cables as shown below when installing, moving, or opening the covers of this product or attached devices.



NOTES: 1. In the UK, by law, the telephone cable must be connected after the power cord.
2. In the UK, by law, the telephone line cable must be disconnected before the power cable

Varoitukset

Sähköturvallisuus

Varoitus

Verkkojohdoissa sekä puhelin- ja tietoliikennekaapeleissa kulkeva sähkövirta voi olla vaarallista. Kun laitteita asennetaan tai siirretään tai kun niiden suojakuoria avataan, kaapelit ja verkkojohdot on irrotettava seuraavassa kuvatulla tavalla. Muutoin voit saada sähköiskun.

Tee seuraavat toimet aina *ennen* kuin irrotat suojakuoren:

1. Katkaise virta tietokoneesta ja siihen liitetyistä laitteista, kuten näyttimistä, kirjoittimista ja ulkoisista levyasemista.
2. Irrota kaikki verkkojohdot pistorasioista.
3. Irrota kaikki tietoliikennekaapelit ulkoisista vastakkeista.
4. Irrota kaikki kaapelit ja verkkojohdot laitteen vastakkeista.

Huomautus: Älä kytke kaapeleita ja verkkojohtoja, ennen kuin laite on koottu toimintakuntoon ja sen suojakuori on asennettu paikalleen.

Varoitus Älä irrota virtalähteen suojakuorta. Jos virtalähteessä on vika, huollata tietokone.

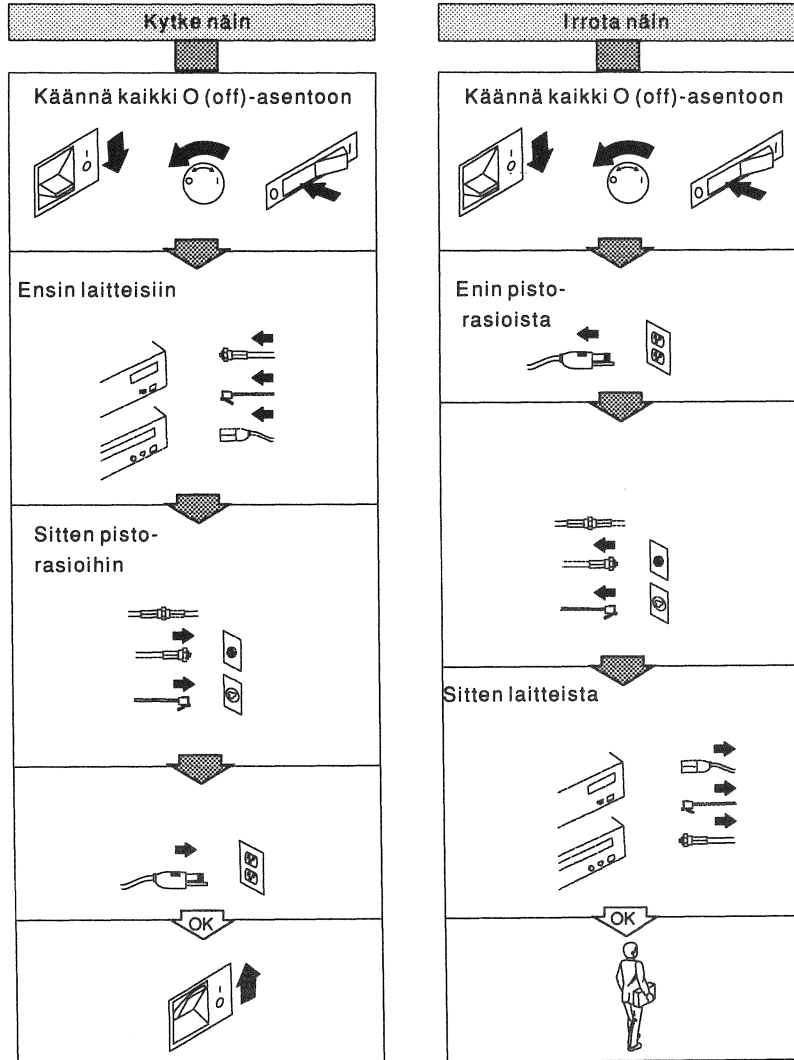
Varoitus

Keskusyksikkö lisävarusteineen voi painaa 17 kiloa. Älä yritä nostaa keskusyksikköä yksin, jos se tuntuu liian painavalta.

**VAARA**

Sähkö-, puhelin- ja tietoliikennekaapeleissa voi esiintyä vaarallisia jännitteitä.

Älä käsittele kaapeleita ukonilman aikana.



Hinweise ACHTUNG

Elektrische Sicherheit

VORSICHT:

An Netz-, Telefon- oder Datenleitungen können gefährliche elektrische Spannungen anliegen. Zur Vermeidung von elektrischen Schlägen sollten alle Netzkabel und sonstige Kabel wie unten beschrieben gelöst werden.

Aus Sicherheitsgründen vor dem Entfernen der Abdeckungen folgende Schritte ausführen:

1. Den Computer und alle angeschlossenen Einheiten wie Drucker, Datensichtgeräte und externe Laufwerke ausschalten.
2. Alle Netzkabel von den Steckdosen abziehen.
3. Alle Übertragungskabel von den Steckdosen abziehen.
4. Alle Netzkabel und sonstige Kabel von der Rückseite des Computers lösen.

Anmerkung: Netzkabel und sonstige Kabel erst wieder anschließen, nachdem der Computer wieder aufgestellt und die Abdeckung angebracht wurde.

VORSICHT:

Die Abdeckung des Netzteils darf nicht entfernt werden. Bei Problemen mit dem Netzteil den Computer vom Fachmann überprüfen lassen.

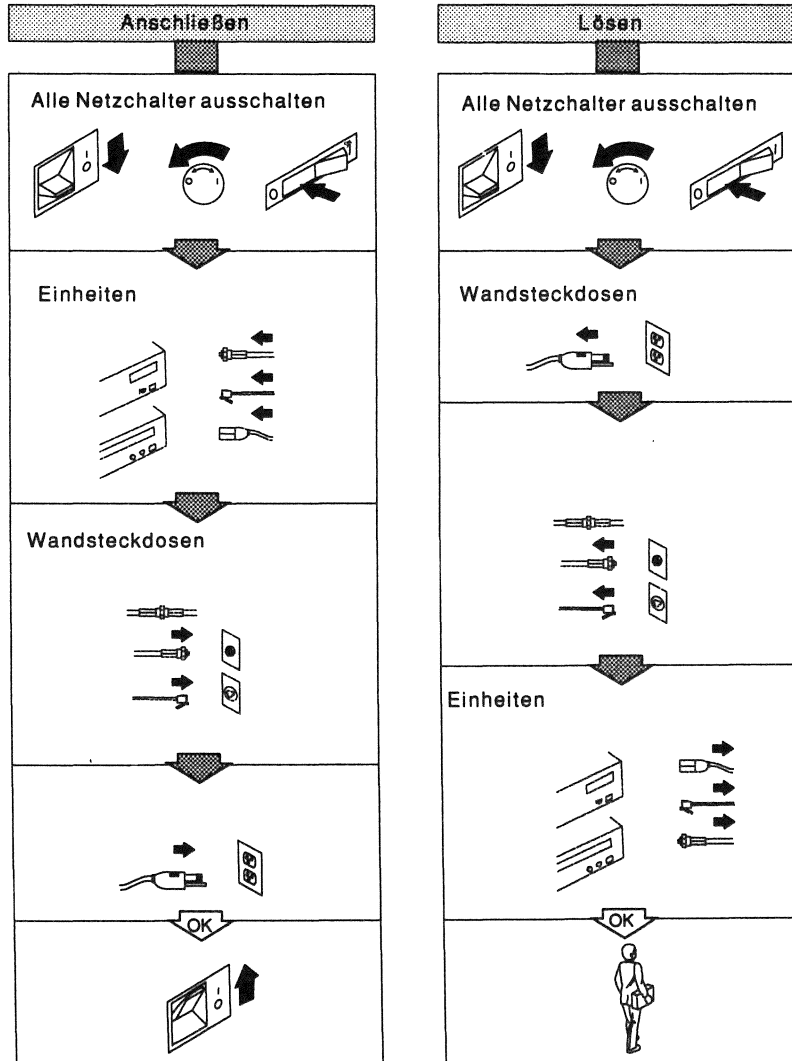
VORSICHT:

Die Systemeinheit kann, einschließlich der Systemerweiterungen, bis zu 17 kg wiegen. Nicht alleine anheben.



GEFAHR

Der Benutzer sollte beim Installieren der Systemeinheit oder weiterer Einheiten die Kabel in der unten dargestellten Reihenfolge anschließen bzw. lösen.
Bei Gewitter sollten die Kabel weder angeschlossen noch gelöst werden.



Disposizioni per la sicurezza

Norme di sicurezza elettrica

ATTENZIONE:

La corrente elettrica circolante nei cavi di alimentazione, del telefono e di segnale è pericolosa. Per evitare scosse elettriche, scollegare i cavi di alimentazione e di segnale nella sequenza contenuta nelle informazioni di seguito riportate.

Per garantire un adeguato livello di sicurezza, *prima* di rimuovere il coperchio, procedere come segue:

1. Spegnerne il sistema e tutti i dispositivi ad esso collegati: stampanti, video ed unità esterne.
2. Scollegare tutti i cavi di alimentazione dalle prese elettriche.
3. Scollegare tutti i cavi per comunicazioni dalle prese esterne.
4. Scollegare tutti i cavi per comunicazioni e di alimentazione dalla parte posteriore del sistema.

Nota:

Non ricollegare nessun cavo di segnale o di alimentazione prima di aver rimontato il sistema e riposizionato il relativo coperchio.

ATTENZIONE:

Non togliere mai il coperchio dell'alimentatore. Quando si rileva un problema relativo all'alimentatore, richiedere assistenza tecnica per il sistema.

ATTENZIONE:

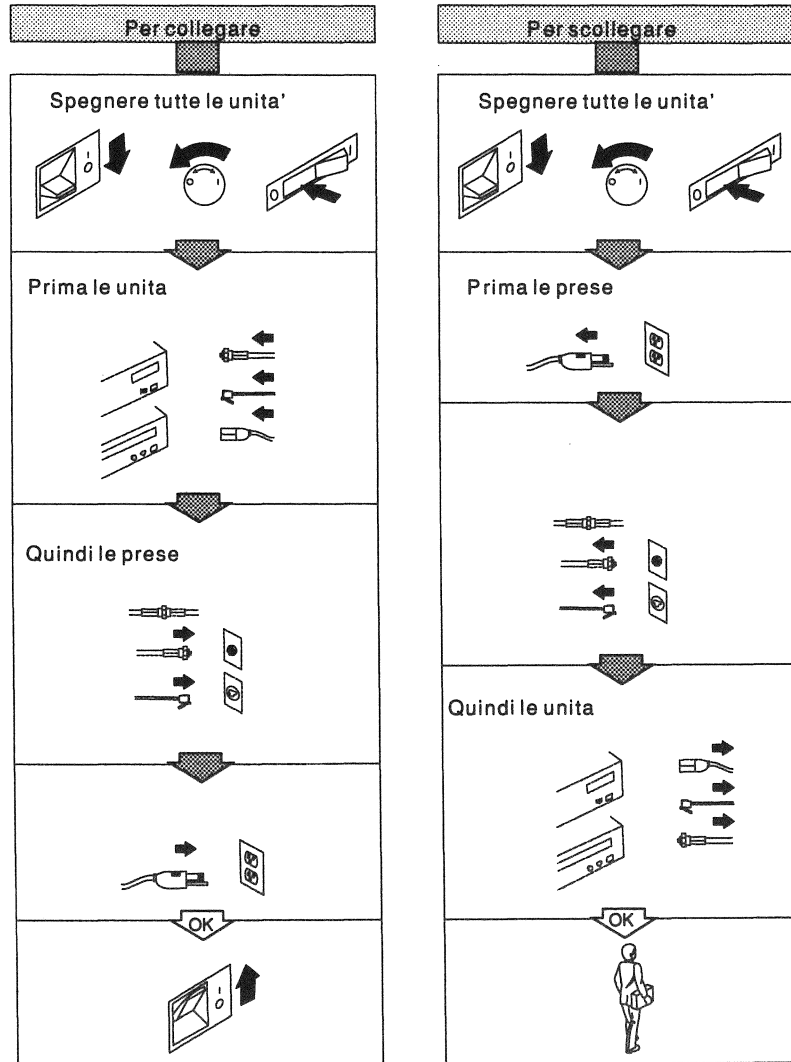
Il sistema completo di tutte le opzioni può pesare fino a 17 Kg. Non tentare il sollevamento del sistema il cui peso si presume notevole, senza l'aiuto di un'altra persona.



PERICOLO

La corrente elettrica dell'alimentazione, del telefono e dei cavi di comunicazione è pericolosa. Collegare e scollegare i cavi come mostrato quando si installa, si trasporta o si tolgono i coperchi di questo prodotto o delle unità ad esso collegate.

Non maneggiare i cavi di interconnessione durante temporali.



Instructies "Let op !"

Elektrische veiligheid

LET OP !:Elektrische stroom van netvoeding, telefoon en communicatiekabels kan gevaarlijk zijn. Om het risico van een elektrische schok te vermijden, moet u alle netsnoeren en kabels loskoppelen zoals hieronder beschreven wordt.

Doe altijd het volgende *voordat* u de behuizing verwijdert, voor uw eigen veiligheid:

1. Schakel de computer en alle aangesloten apparatuur zoals printers, beeldschermen en externe stations uit.
2. Trek alle netsnoeren uit de stopcontacten.
3. Koppel alle communicatiekabels los van de externe stopcontacten.
4. Koppel alle kabels en netsnoeren los van de achterzijde van de computer.

Opmerking: Sluit geen kabels of netsnoeren weer aan voordat u de computer opnieuw hebt gemonteerd en de behuizing hebt teruggeplaatst.

LET OP !: Verwijder nooit de kap van het voedingsblok. Als er zich een probleem met het voedingsblok voordoet, laat uw computer dan nakijken.

LET OP !: De computer met de opties kan tot 17 kilo wegen. Probeer hem niet alleen op te tillen als u denkt dat het te zwaar is voor u.

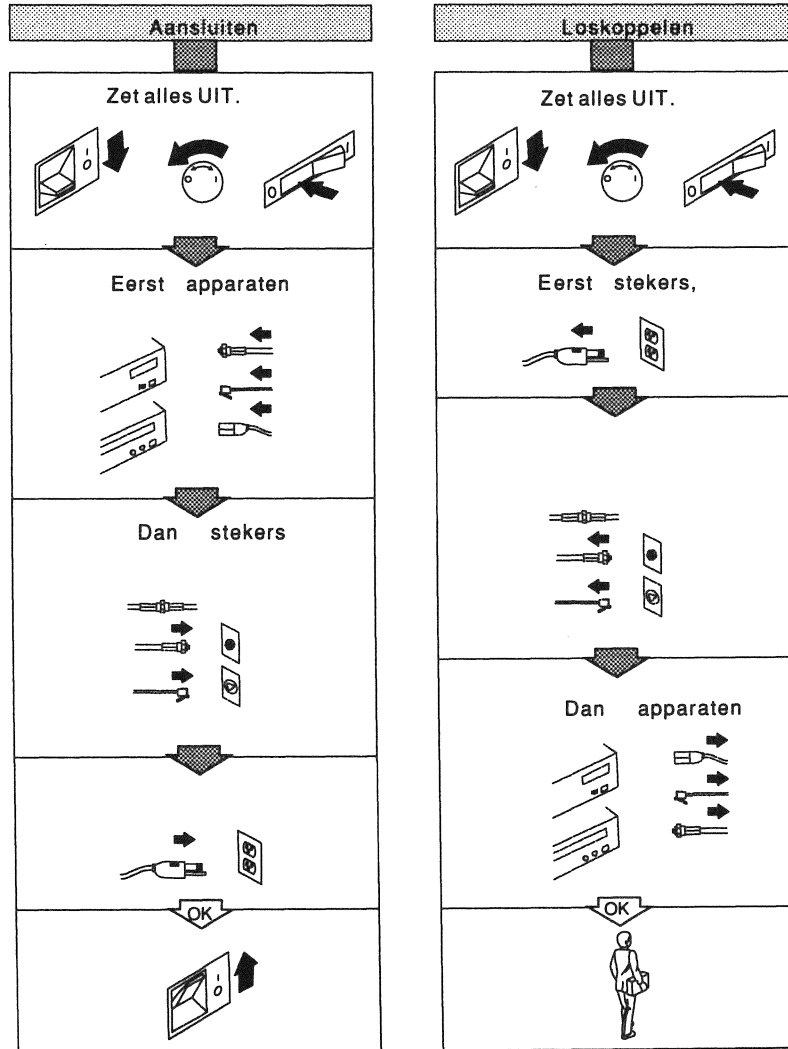


GEVAAR !

Elektriciteit kan gevaarlijk zijn.
Volg onderstaande afbeelding voor aansluiten en loskoppelen van kabels en snoeren

alvorens de computer of randapparatuur te installeren, te verplaatsen of te openen.

U wordt geadviseerd tijdens onweer geen kabels aan te sluiten of te ontkoppelen. U wordt ook ontraden tijdens onweer apparatuur te installeren of opnieuw te configureren of onderhoud uit te voeren.



Säkerhetsinformation

Elsäkerhet

Varning — risk för personskada:

Elektrisk ström från nät-, telefon- och kommunikationskablar kan vara farlig. För att inte riskera att få elstötar ska du koppla ur alla nätkablar och andra kablar så som beskrivs här.

Gör alltid följande *innan* du tar bort kåpan:

1. Stäng av datorn och anslutna enheter såsom skrivare, bildskärmar och externa diskenheter.
2. Lossa alla nätkablar från eluttagen.
3. Lossa alla kommunikationskablar från externa enheter.
4. Koppla ur samtliga kablar på datorns baksida.

Note: Återanslut inga kablar förrän du har satt ihop datorn och monterat kåpan.

Varning — risk för personskada:

Öppna aldrig kraftaggregatet. Om du får problem med det ska du begära service på datorn.

Varning — risk för personskada:

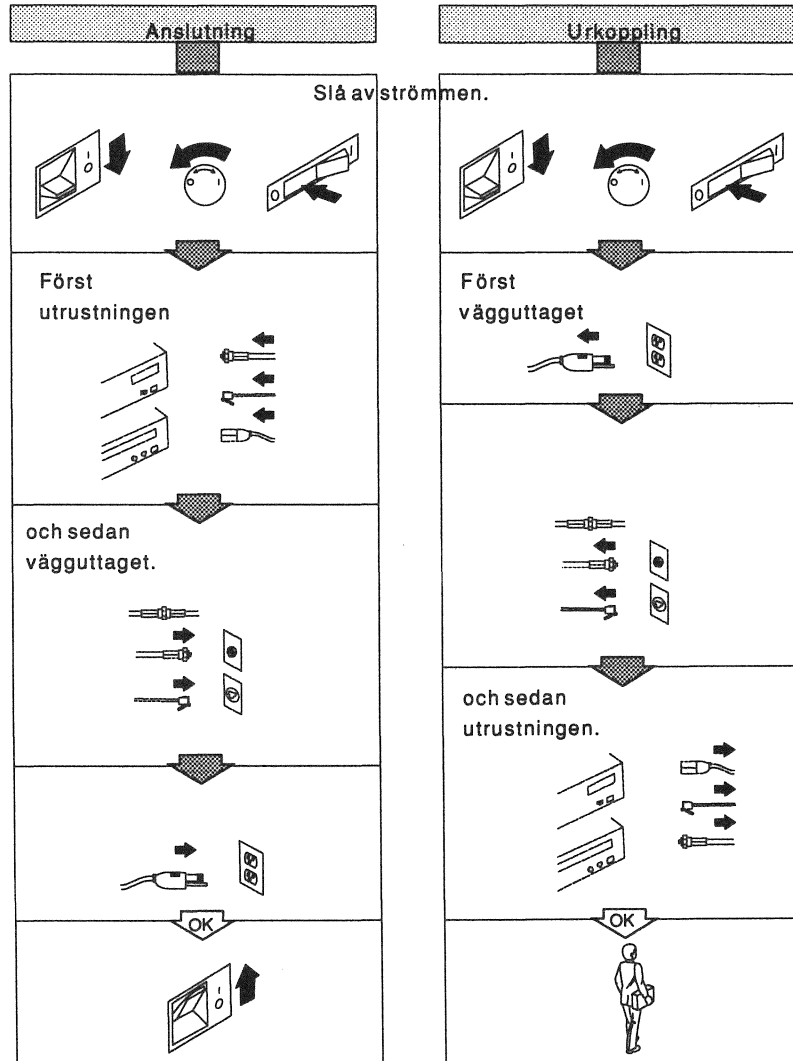
Med extrautrustning kan datorn väga upp till 17 kg. Försök inte lyfta den själv om du tror att den är för tung för dig.



Varning

Koppla i och ur kablarna till maskinen och utrustningen enligt nedan.

Rör inga kabelkontakter vid åskväder.



Informações Sobre Segurança

Segurança Eléctrica

CUIDADO:

A corrente eléctrica presente nos cabos de alimentação, de comunicações e telefónicos, representa um risco. Para evitar choques eléctricos, desligue todos os cabos, tal como se indica a seguir.

Para sua segurança, proceda sempre do seguinte modo, *antes* de retirar a tampa:

1. Desligue o computador e todos os dispositivos a ele ligados, tais como impressoras, monitores e unidades externas.

Nota: No Reino Unido, os utilizadores de computadores industriais que possuem um modem ou um fax ligado ao computador, devem desligar a linha telefónica do computador *antes* de desligar os cabos de alimentação. Ao voltarem a ligar o computador, devem ligar a linha telefónica somente *depois* de ligados os cabos de alimentação.

2. Retire todos os cabos de alimentação das tomadas de corrente.
3. Desligue todos os cabos de comunicações das tomadas externas.
4. Retire todos os cabos da parte de trás do computador.

Nota: Não torne a ligar os cabos antes de o computador estar novamente montado e com a tampa colocada.

CUIDADO:

Nunca abra a unidade de alimentação. Se esta se avariar, chame o técnico.

CUIDADO:

O computador, com todas as opções instaladas, pesa cerca de 17 kg. Não tente levantá-lo sozinho, se isso representa um esforço para si.

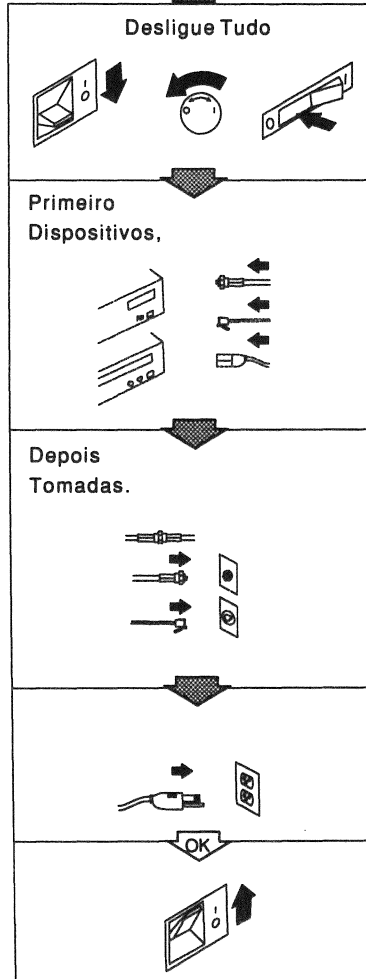


PERIGO

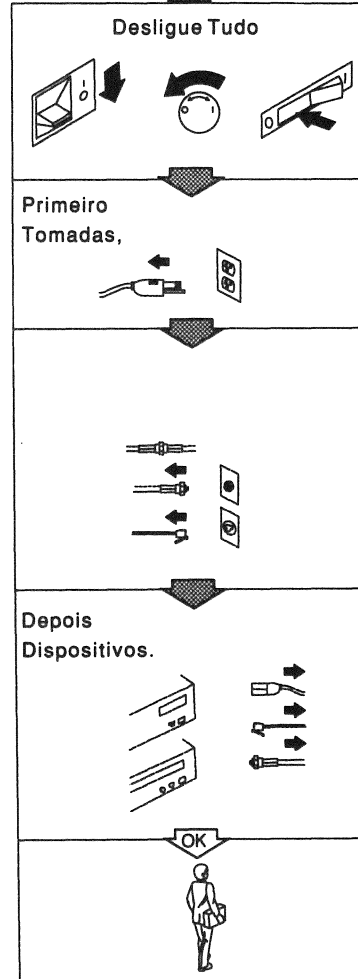
Corrente eléctrica proveniente de cabos de energia, telefone e comunicações pode ser perigosa. Quando instalar, mover, ou abrir a cobertura deste produto, ou de dispositivos a ele ligados, siga as instruções para ligar e desligar os cabos.

Sempre que haja possibilidade de trovoadas não ligue nem desligue cabos, nem efectue trabalhos de instalação, assistência técnica ou reconfiguração.

Para Ligar



Para Desligar



Instruções de Segurança

Segurança Elétrica

CUIDADO:

Corrente elétrica de cabos de força, de telefone e de comunicação pode ser perigosa. Para evitar qualquer risco de choque, você deve desconectar todos os cabos e cabos de força conforme é descrito na informação a seguir.

Para sua segurança, proceda sempre da seguinte maneira *antes* de remover a tampa:

1. Desligue o computador e quaisquer dispositivos conectados, tais como impressoras, vídeos e unidades externas.

Nota: Usuários de computador industrial no Reino Unido que possuem uma máquina de modem ou de fax conectada ao seu computador devem desconectar a linha telefônica do computador *antes* de desligar quaisquer cabos de força. Ao montar seu computador, conecte novamente a linha telefônica *após* ligar os cabos de força.

2. Desligue todos os cabos de força das tomadas elétricas.
3. Desconecte todos os cabos de comunicação de tomadas externas.
4. Desconecte todos os cabos e cabos de força da parte de trás do computador.

Nota: Não conecte novamente quaisquer cabos ou cabos de força até que você monte o computador e coloque a tampa na parte de trás.

CUIDADO:

Nunca retire a tampa da fonte de alimentação. Se houver algum problema com a fonte de alimentação, solicite assistência técnica.

CUIDADO:

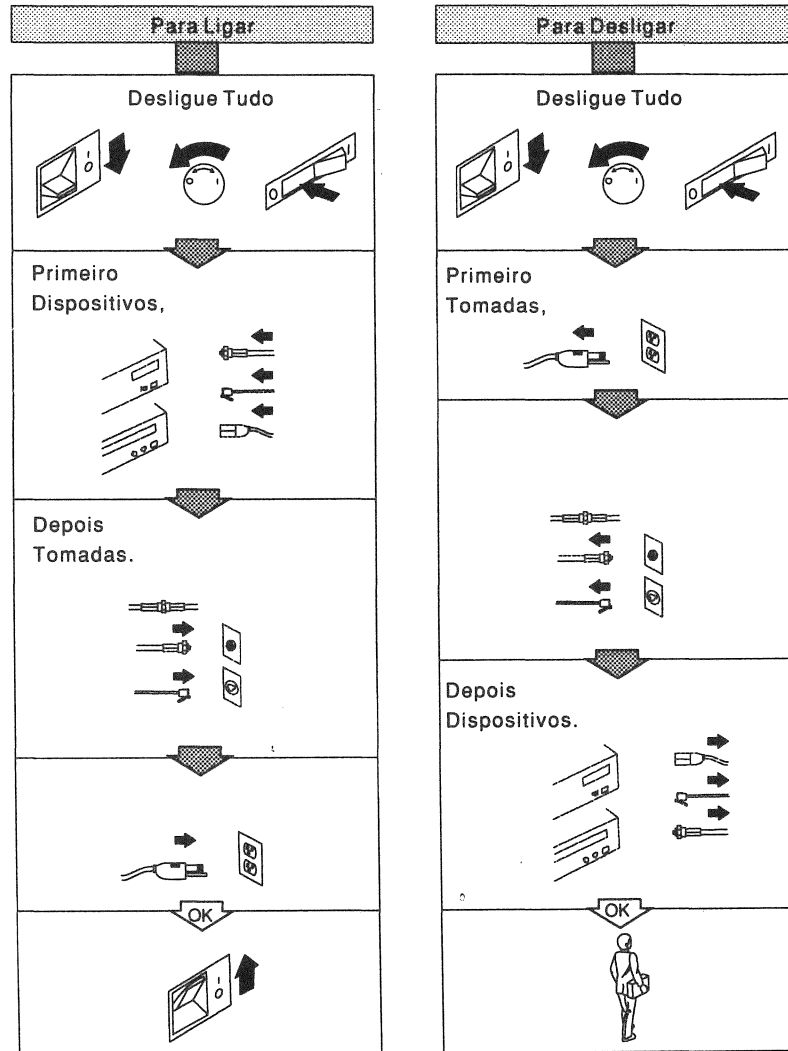
O computador com opcionais pode pesar até 17 quilos (37.8 libras). Não tente levantá-lo sozinho se achar que ele é muito pesado para você.



PERIGO

Corrente eléctrica proveniente de cabos de energia, telefone e comunicações pode ser perigosa. Quando instalar, mover, ou abrir a cobertura deste produto, ou de dispositivos a ele ligados, siga as instruções para ligar e desligar os cabos.

Sempre que haja possibilidade de trovoadas não ligue nem desligue cabos, nem efectue trabalhos de instalação, assistência técnica ou reconfiguração.



Consignes de sécurité électrique

ATTENTION

Le courant électrique qui circule dans les cordons d'alimentation, les câbles de téléphone et de transmission peut être dangereux. Pour éviter tout risque de choc électrique, débranchez tous les cordons d'alimentation en respectant les informations suivantes.

Pour votre sécurité, suivez les directives ci-dessous *avant* de retirer le carter.

1. Mettez hors tension l'ordinateur et toutes les unités connectées (imprimante, écran et dispositifs externes...).

Remarque: Les personnes qui, en Grande-Bretagne, connectent un modem ou un télécopieur à leur ordinateur industriel doivent débrancher le câble téléphonique de l'ordinateur *avant* de débrancher tous les autres cordons d'alimentation. Au moment de monter l'ordinateur, rebranchez le câble téléphonique *après* les cordons d'alimentation.

2. Débranchez tous les cordons d'alimentation des socles de prise de courant.
3. Débranchez tous les câbles de transmission des socles de prise de courant.
4. Débranchez tous les cordons d'alimentation de la face arrière de l'ordinateur.

Remarque: Ne rebranchez aucun cordon d'alimentation avant d'avoir monté l'ordinateur et reposé le carter.

ATTENTION

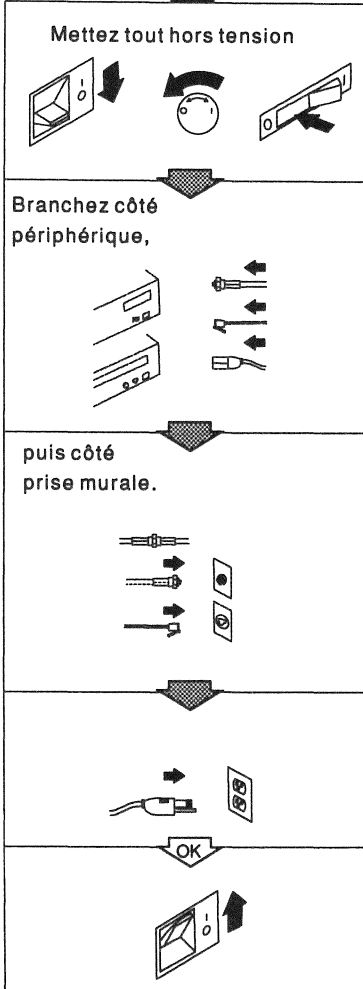
Ne retirez jamais le couvercle du bloc d'alimentation. Si le bloc d'alimentation est défectueux, faites réparer l'ordinateur.



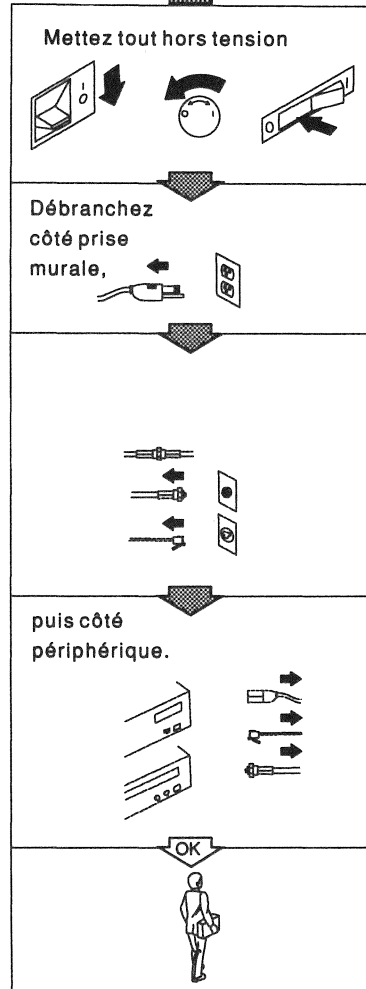
Le courant électrique provenant de l'alimentation, du téléphone et des câbles de transmission, peut présenter un danger.

Connectez et déconnectez les câbles comme indiqué ci-dessous lorsque vous installez ou déplacez des ordinateurs personnels ou des périphériques, et lorsque vous soulevez un couvercle. Ne touchez pas aux câbles pendant

Pour connecter



Pour déconnecter



Sikkerhedsforskrifter mærket 'Pas på!'

Sikkerhedsforskrifter vedr. elektricitet

Pas på!

Elektrisk strøm fra kommunikationskabler, telefoner og udstyr, der er tilsluttet elnettet, kan være farlig. Undgå elektrisk stød: Afmontér alle kabler og netledninger som beskrevet i følgende information.

Før dækslet fjernes:

1. Sluk for strømmen til computeren og til det udstyr, der er tilsluttet den, f.eks. printere, skærme og eksterne drev.
2. Træk alle netledninger ud af stikkontakterne.
3. Træk alle kommunikationskabler ud af stikkontakterne.
4. Afmontér alle kabler og netledninger fra bagsiden af computeren.

Bemærk: Kabler og netledninger må ikke forbindes, før computeren er færdigmonteret, og dækslet igen er på plads

Pas på!

Strømforsyningsenhedens dæksel må aldrig fjernes. Hvis der er problemer med strømforsyningsenheden, skal en servicetekniker se på den.

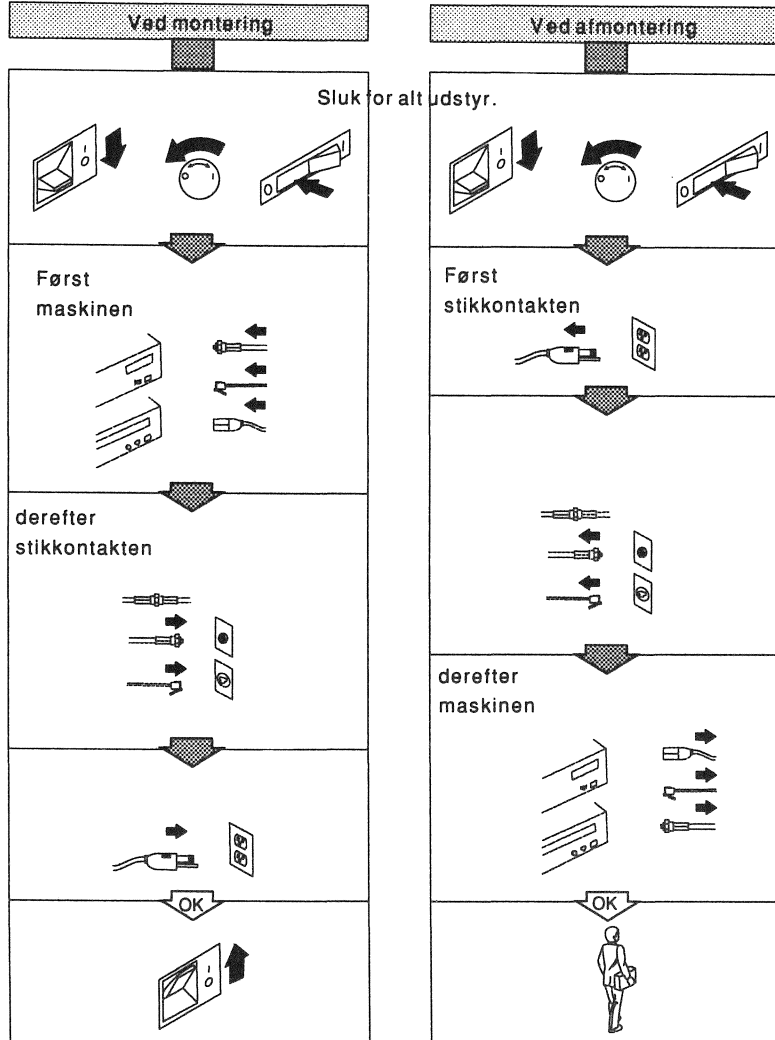
Pas på!

Computeren kan veje ca 17 kg. Få hjælp til at løfte den.



Pas på

Elektrisk strøm fra el-, telefon- og kommunikationskabler er farlig. Monter og afmonter kabler som vist nedenfor, når PC'ere og ekstraudstyr skal installeres eller flyttes. Kabler bør ikke monteres eller afmonteres i tordenvejr.



Advarsler

Sikkerhet ved bruk av elektriske enheter

ADVARSEL:

Strøm fra elektriske kabler, telefonledninger og kommunikasjonskabler er farlig. Du må koble til og fra alle strømledninger og kabler slik det er beskrevet her.

Følg alltid disse punktene *før* du tar av dekselet:

1. Slå av datamaskinen og alle tilknyttede enheter som skrivere, skjermer og frittstående diskettstasjoner.
2. Trekk ut alle strømledninger fra stikkontaktene.
3. Trekk ut alle kommunikasjonskabler fra kontaktene.
4. Trekk ut alle ledninger og nettkabler bak på maskinen.

Merk: Ikke sett inn igjen noen av kablene før du har satt sammen maskinen og satt på plass dekselet.

ADVARSEL:

Ta aldri av dekselet til strømforsyningsenheten. Hvis du får problemer med strømforsyningsenheten, må maskinen repareres.

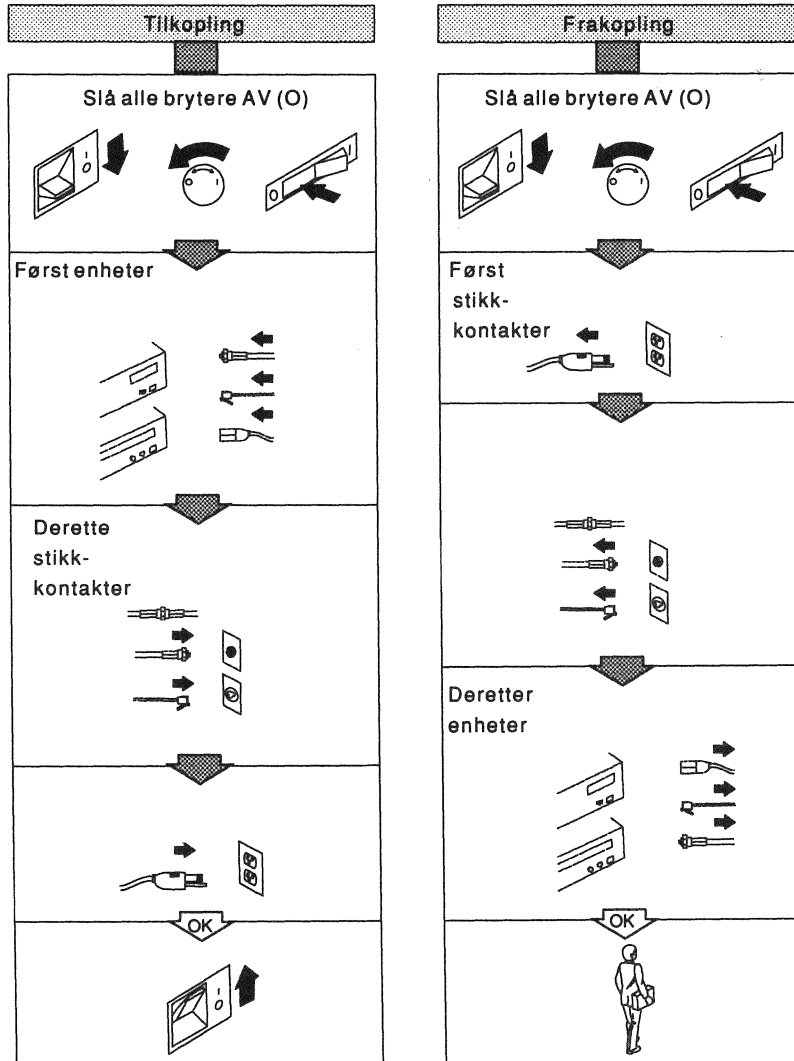
ADVARSEL:

Maskinen kan sammen med tilleggsutstyret veie opptil 17 kg. Vær forsiktig når du skal flytte på den og ikke prøv å løfte den alene hvis du tror den er for tung for deg.



FARE!

Elektrisk strøm fra nettet, og fra telefon- og kommunikasjonskabler er farlig. Kablene må koples til og fra slik det er vist på tegningen når du installerer, flytter eller åpner deksler på maskinen eller på enheter som er knyttet til den. Ikke rør noen av kablene i tordenvær.



Avisos de Precaución

Seguridad Eléctrica

PRECAUCIÓN:

La corriente eléctrica en cables de alimentación, teléfonos y comunicaciones puede ser peligrosa. Para evitar descargas peligrosas, debe desconectar todos los cables como se describe en la siguiente información

Para su seguridad, haga siempre lo siguiente *antes* de retirar la cubierta:

1. Apague el sistema y cualquier dispositivo conectado, tal como impresoras, monitores y dispositivos externos.

Nota: Los usuarios de sistemas industriales en el Reino Unido que tengan conectado un módem o fax al sistema, deben desconectarlos de la línea telefónica *antes* de desenchufar cualquier cable de alimentación. Cuando monte su sistema, vuelva a conectar la línea telefónica *después* de enchufar los cables de alimentación.

2. Desenchufe todos los cables de alimentación de la toma de corriente.
3. Desconecte todos los cables de comunicación de los receptáculos externos.
4. Desconecte todos los cables de alimentación de la parte posterior del sistema.

Nota: No vuelva a conectar ningún cable de alimentación hasta que monte de nuevo el sistema y vuelva a poner la cubierta.

PRECAUCIÓN:

Nunca retire la cubierta de la fuente de alimentación. Si tiene algún problema con la fuente de alimentación, solicite servicio técnico.

PRECAUCIÓN:

El sistema con sus opciones puede pesar 17 Kilogramos (37.8 libras). Si cree que es demasiado pesado, no intente levantarlo solo.

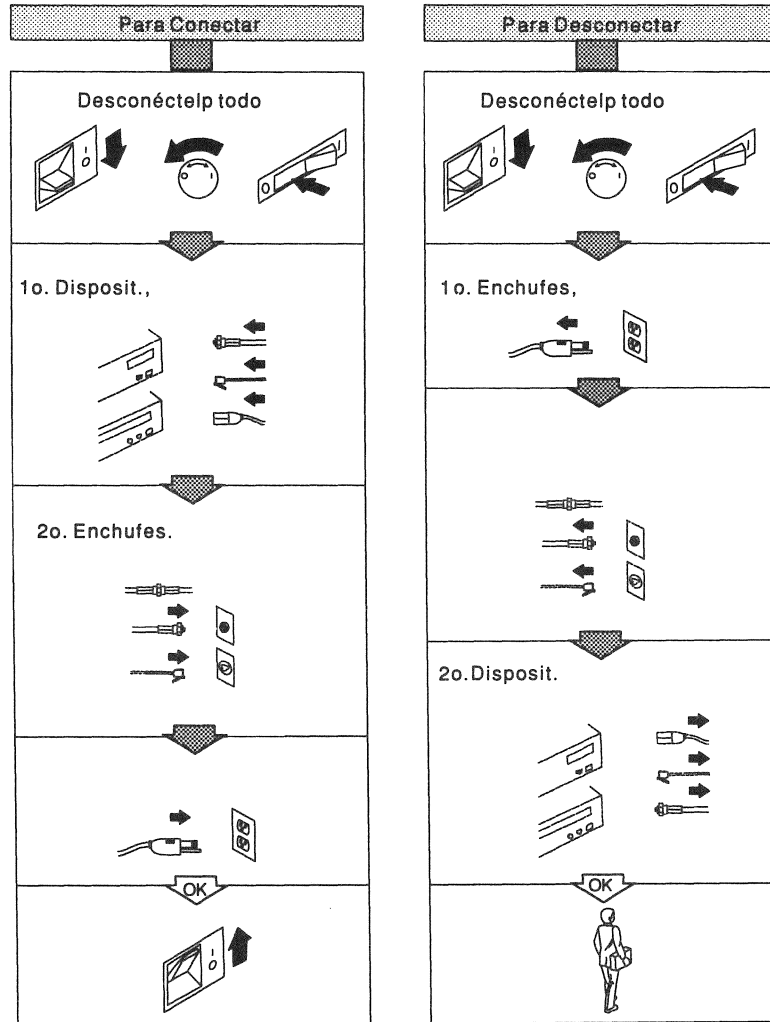


PELIGRO

La corriente eléctrica de alimentación, teléfono y cables de comunicación es peligrosa. Conecte y desconecte los cables

como se muestra para instalar, mover o abrir las tapas de este producto o dispositivos conectados.

Durante periodos de tormenta eléctrica, no conecte ni desconecte ningún cable ni efectúe instalación, mantenimiento ni reconfiguración.



Consignes de sécurité électrique

ATTENTION !:

Le courant électrique qui circule dans les cordons d'alimentation, les câbles de téléphone et de transmission peut être dangereux. Pour éviter tout risque de choc électrique, débranchez tous les cordons d'alimentation et tous les câbles en respectant les informations suivantes.

Pour votre sécurité, suivez les directives ci-dessous *avant* de retirer le carter.

1. Mettez hors tension l'ordinateur et toutes les unités connectées (imprimantes, écrans et dispositifs externes...).
2. Débranchez tous les cordons d'alimentation des socles de prise de courant.
3. Débranchez tous les câbles de transmission des prises externes.
4. Débranchez tous les cordons d'alimentation et tous les câbles de la face arrière de l'ordinateur.

Remarque: Ne rebranchez aucun cordon d'alimentation ou câble avant d'avoir monté l'ordinateur et reposé le carter.

ATTENTION !:

Ne retirez jamais le couvercle du bloc d'alimentation. Si le bloc d'alimentation est défectueux, faites réparer l'ordinateur.

ATTENTION !:

L'ensemble unité centrale et dispositifs en option peut peser jusqu'à 17 kilos. Faites attention lorsque vous déplacez l'unité. N'essayez pas de soulever une charge trop lourde.

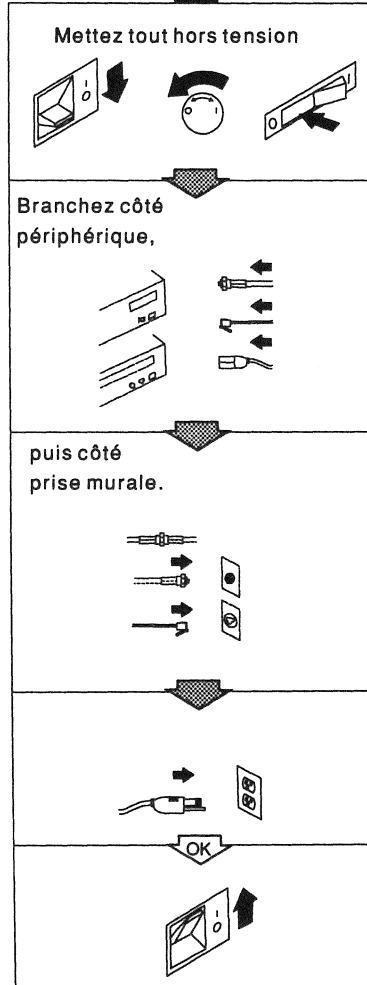


DANGER

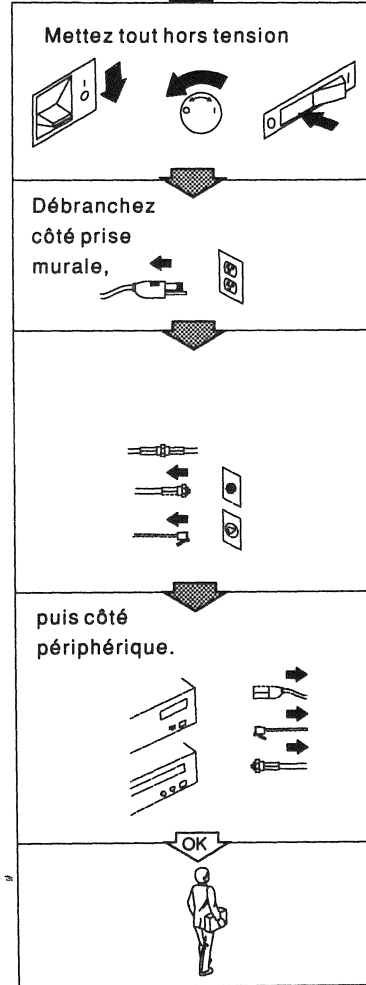
Le courant électrique provenant de l'alimentation, du téléphone et des câbles de transmission, peut présenter un danger.

Connectez et déconnectez les câbles comme indiqué ci-dessous lorsque vous installez ou déplacez des ordinateurs personnels ou des périphériques, et lorsque vous soulevez un couvercle. Ne touchez pas aux câbles pendant

Pour connecter



Pour déconnecter



注意の但し書き

電気的安全

注意：
電源コード、電話回線、および通信ケーブルに流れている電流は危険な場合があります。感電しないように、次の手順にしたがって、すべての電源コードおよびケーブルを切り離す必要があります。

安全のため、カバーを取り外す前に必ず次の準を実行してください。

1. コンピューターおよびすべての接続装置、たとえば印刷装置、表示装置、そして外部駆動機構等の電源を切ります。
2. すべての電源コードのプラグを電源コンセントから抜きます。
3. すべての通信ケーブルを外側レセプタクルから切り離します。
4. すべてのケーブルおよび電源コードをコンピューターの後面から切り離します。

注： コンピューターを再度組立ててカバーをまたに閉ずるまでは、ケーブルまたは電源コードは例れも再接触しないでください。

注意：
パワー・サブライのカバーは決して取り外したりしないでください。パワー・サブライに問題がある場合は、コンピューターを修理してもらってください。

注意：
コンピューターにオプションが付いている場合は、その重さは15.9kgほどになります。コンピューターが自分には重すぎると思われる場合は、自分だけでそれを持ち上げようとしたりしないでください。

Lithium Battery Notice

CAUTION

The lithium battery presents a fire, explosion, or severe burn risk. Do not recharge it, remove its polarized connector, disassemble it, heat it above 100 C (212 F), incinerate it, or expose its cell contents to water. Dispose of the battery as required by local ordinances or regulations. When replacing the battery, use only Part No. 33F8354. Use of another battery could result in ignition or explosion of the battery. Replacement batteries can be ordered from IBM or IBM Authorized Dealers.

ADVARSEL

Litiumbatteriet kan forårsage brand, eksplosion eller alvorlige brandsår. Det må ikke genoplades, åbnes, udsættes for mere end 100 grader C, brændes eller komme i berøring med vand. Desuden må man ikke fjerne forbindelsesstikket fra det. Litiumbatteriet destrueres som foreskrevet af myndighederne. Ved udskiftning af litiumbatteriet anvendes partnummer 33F8354. Brug af andre former for batterier kan medføre, at batteriet brænder eller eksploderer. Nye batterier bestilles gennem IBM eller IBM-forhandleren.

WAARSCHUWING

De lithiumbatterij kan brand- en explosiegevaarlijk zijn. De batterij mag niet worden opgeladen, gedemonteerd, verbrand of boven 100°C worden verhit. Laat de inhoud niet in aanraking komen met water en verwijder de gepolariseerde aansluiting niet. Bescherm het milieu; lever oude batterijen in bij inzamelpunten. Gebruik ter vervanging uitsluitend batterijen met bestelnummer 33F8354. Gebruik van andere batterijen kan leiden tot ontbranding of explosie. Nieuwe batterijen kunnen worden besteld bij IBM of geautoriseerde IBM-dealers.

ATTENTION !

Prenez garde aux risques d'incendie, d'explosion et de brûlures graves liés à l'utilisation d'une pile au lithium. Ne rechargez pas la pile, n'en retirez pas le connecteur et ne la démontez pas. Ne la chauffez pas au-delà de 100°C (212°F) et n'en exposez pas le contenu à l'eau. Détruisez-la conformément à la réglementation en vigueur. Si vous la remplacez, commandez une pile de rechange sous la référence 33F8354 : toute autre pile risquerait de prendre feu ou d'exploser. Les piles de rechange peuvent être obtenues auprès d'IBM ou d'un distributeur agréé IBM.

VAROITUS

Litiumparisto voi syttyä tuleen, räjähtää tai aiheuttaa vakavia palovammoja. Ölä koskaan lataa paristoa uudelleen, irrota pariston polarisoitua liitintä, pura paristoa, kuumenna paristoa yli 100°C lämpötilaan, polta paristoa tai päästä vettä pariston sisään. Hävitä paristo paikallisten määräysten mukaisesti. Vaihda pariston tilalle ainoastaan tuote 33F8354. Muun pariston käyttö voi johtaa sen syttymiseen tai räjähtämiseen. Vaihtoparistoja voi tilata IBM:stä tai valtuutetulta IBM-jälleenmyyjältä.

ACHTUNG

Lithiumbatterien sind feuergefährlich, explosiv und können schwere Verätzungen verursachen. Bei Außerbetriebsetzen (Verschrotten) des Gerätes örtliche Entsorgungsrichtlinien für Sondermüll beachten. Die Batterie darf nicht mit Wasser in Berührung gebracht, über 100 Grad erhitzt, wieder aufgeladen, repariert oder zerlegt werden. Eine verbrauchte Batterie nur durch eine Batterie mit der Teilenummer 33F8354 ersetzen. Andere Batterien können sich entzünden oder explodieren. Ersatzbatterien können von IBM oder einem IBM Vertragshändler bezogen werden.

ATTENZIONE

La batteria al litio può incendiarsi, esplodere o procurare serie bruciature. Evitare di ricaricarla, toglierle il connettore polarizzato, smontarla, riscaldarla ad una temperatura superiore ai 100 gradi centigradi, incendiarla o gettarla in acqua. Per eliminarla seguire le procedure di sicurezza aziendali e quanto stabilito dal DPR 915 del 10-9-82 e successive disposizioni. Sostituire solo con la parte IBM N. 33F8354. L'uso di una diversa batteria potrebbe provocare incendi o esplosioni. Ordinare le batterie all'IBM o ai rivenditori autorizzati.

ADVARSEL

På grunn av brann- og eksplosjonsfare må ikke litiumsbatterier lades opp, taes fra hverandre, brennes eller utsettes for sterk varme over 100°C. Ikke fjern de polariserte tilkoblingene eller utsett batteriene for vann. Brukte batterier bør kastes så raskt som mulig og i henhold til gjeldende forskrifter. Bruk bare batterier med delnummer 33F8354 når du bytter batteri. Bruk av feil batteri kan føre til at batteriet antennes eller eksploderer. Nye batterier kan bestilles fra autoriserte IBM PC-forhandlere.

CUIDADO

A pilha de lítio representa um risco de incêndio, explosão ou de graves queimaduras. Não a recarregue, remova o conector polarizado, desmonte, aqueça acima de 100°C (212°F), queime ou molhe o conteúdo da célula. Destrua a pilha de acordo com os regulamentos locais. Quando substituir a pilha, utilize apenas a peça com o número de referência 33F8354. A utilização de qualquer outra pilha poderá ocasionar auto-ignição ou explosão da pilha. Podem ser encomendadas pilhas sobresselentes à IBM ou aos seus Concessionários Autorizados.

WARNING:

Litiumbatterier kan explodera eller börja brinna. Ladda inte upp det, ta inte bort dess polariserade anslutningar, upphetta det inte över 100°C, ta inte isär det och utsätt inte batteriets cellinnehåll för vatten. Om du ska byta batteriet ska du byta till ett batteri med beställningsnummer 33F8354. Om du använder något annat batteri kan det antändas eller explodera. Beställ batterier från IBM eller från en av IBM auktoriserad återförsäljare.

PRECAUCION

La batería de litio representa un peligro de incendio, explosión o de graves quemaduras. No la recargue, quite su conector polarizado, desmonte, caliente a más de 100°C (212°F), la incinere o someta su contenido al agua. Deshágase de la batería según los reglamentos u ordenanzas locales. Utilice como recambio sólo el número de pieza No. 33F8354. La utilización de otra batería podría provocar su deflagración o explosión. Las baterías de recambio pueden pedirse a IBM o a Concesionarios Autorizados IBM.

Handling Static-Sensitive Devices

Warning: Static electricity can seriously damage computer components or options. When you handle options and other computer components, take these precautions to avoid static electricity damage:

- When you are installing a new option, do not open the static-protective package containing the option until you are ready to actually install it.
- Before handling electronic components, touch a grounded metal surface to discharge any static buildup in your body.
- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle components carefully. Handle adapters and memory-module kits by the edges. Never touch any exposed circuitry.
- Prevent others from touching components.
- When you are installing a new option, touch the static-protective package containing the option to an unpainted metal surface on the computer for at least two seconds. (This reduces static electricity from the package and from your body.)
- When possible, remove the option and install it directly into the computer without setting the option down. When this is not possible, place the static-protective package that the option came in, on a smooth, level surface and place the option on it.
- Do not place the option on the computer cover or other metal surface.

Preface

This manual contains user information and service information pertaining to the IBM 7585 Industrial Computer. This manual is divided into two main parts, plus the appendixes:

Part 1, "User Information" contains an introduction to the computer system, and it tells how to install the computer system, operate it, and solve problems with it at the user level.

Part 2, "Hardware Maintenance Information" contains service-oriented information which assists in recognizing and replacing field-replaceable units (FRUs) that have failed or are questionable.

The **Appendixes** contain supplemental information that is generally not required by the user or service person. Much of the information in the Appendixes is useful in planning computer system configuration and physical site preparation.

Part 1:

- Chapter 1 gives a brief description of the 7585 and its options.
- Chapter 2 explains how to install the 7585.
- Chapter 3 explains how to install its options.
- Chapter 4 gives some details of operation.
- Chapter 5 contains general problem-solving information intended for the user level. It contains information on testing the computer, troubleshooting charts, and error messages.

Part 2:

- Chapter 6 provides general checkout instructions and diagnostic procedures for locating failing field-replaceable units (FRUs). Users of these instructions should be familiar with operational procedures for the 7585 Industrial Computer and with the use of a multimeter.
- Chapter 7 shows the location of components and contains instructions on how to remove and replace them.
- Chapter 8 contains illustrations and part numbers of the FRUs.

Appendixes:

- Appendix A contains a convenient place for you to record all unique details about your computer system, such as configuration, installed options, identification numbers, etc. All such details should be recorded when the system is initially installed and updated whenever configuration changes are made.
- Appendix B contains detailed physical dimensions of the system unit.
- Appendix C contains information about the system board jumpers and their settings.
- Appendix D contains information about interrupt and DMA assignments.
- Appendix E describes the installation of the S3** Vision864** SVGA device drivers for the 7585.

Related Publications

You should have the following related publications:

- The installation instructions and other documentation for your computer system's attached devices.
- The manual that contains information about your computer's operating system.
- The manuals that contain information about your computer's application programs.

Part 1. User Information

Part 1 contains an introduction to the computer system, and it tells how to install the computer system, operate it, and solve problems with it at the user level.

Chapter 1. Overview of the 7585 Industrial Computer	1-1
General Description of Features	1-1
General Layout of Components	1-2
System Board Features	1-6
Specifications	1-7
Physical	1-7
Power Supply	1-7
Heat Output	1-7
Environment	1-7
Option Overview	1-9
RAM Memory	1-9
Cache Memory	1-9
Video Memory	1-9
Microprocessor	1-9
Adapters	1-9
Drives	1-9
Drive Sizes and Mountings	1-10
Cover Plates (Bezels)	1-10
Cables	1-10
Integrated Drive Electronics (IDE) Controller	1-10
Small Computer System Interface (SCSI) Drives	1-10
Keyboard	1-13
Pointing Devices	1-13
Parallel Devices	1-13
Serial Devices	1-13
Displays	1-14
Chapter 2. Installing Your Computer	2-1
Before You Begin:	2-1
Step 1. Unpack Your Computer	2-1
Step 2. Check the Voltage Setting	2-2
Step 3. Install Internal Options	2-3
Step 4. Mount the Computer	2-4
Free-Standing	2-4
Rack-Mount Setup with Slide Rails	2-5
Rack-Mount Setup without Slide Rails	2-6
Step 5. Connect the Cables	2-7
Step 6. Power-Up the Computer System and Check It Out	2-8
Step 7. Run the Configuration Utility	2-9
Step 8. Finish the Installation	2-10
Chapter 3. Installing Options	3-1
Switching Off Power and Disconnecting Cables	3-4
Removing the System Unit from its Mounting	3-5
Removing the System Unit from a Rack	3-5

Opening the System Unit	3-5
RAM Memory Modules (SIMMs)	3-6
Cache Memory Modules	3-8
Video Memory Modules	3-10
Adapters	3-11
Internal Drives	3-12
Chapter 4. Operating Instructions	4-1
Controls	4-1
Front Access Door	4-1
Power Switch	4-1
Light-Emitting Diodes (LEDs)	4-1
Power Supply	4-2
Prior to Initial Power-Up	4-2
Starting Up Your System	4-2
Installing an Operating System	4-4
Installing Application Programs	4-4
Air Filters	4-4
Security Features	4-5
Front Access Lock and Keys	4-5
Diskette Write-Protect Jumper	4-5
Serial and Parallel Port I/O Control	4-5
Passwords	4-5
Power-On Password	4-5
System Administrator Password	4-6
Removing a Power-on Password or System Administrator Password ..	4-6
Keyboard Password	4-6
Startup Sequence Control	4-6
Unattended Start Mode	4-6
Keyboardless Operation Mode	4-7
Power Management Program	4-7
Chapter 5. Problem Solving	5-1
Diagnostic Tools	5-2
Power-On Self-Test (POST)	5-2
The Configuration Utility Program	5-3
The Diagnostic Programs	5-3
Troubleshooting Charts	5-3
Error Messages	5-3
Testing the Computer	5-4
Starting the Computer	5-4
Starting the Diskette-Based Diagnostic Program	5-5
Troubleshooting Charts	5-6
Error Messages	5-13
POST Messages	5-13
Diagnostic Messages	5-17

Chapter 1. Overview of the 7585 Industrial Computer

General Description of Features

The IBM 7585 Industrial Computer has been designed for use over a long life in an environment of constantly advancing technology. It is engineered for flexibility, growth, and upgradability. Its chassis and covers are designed to be used for many different Industrial Computer configurations — whatever suits the needs of the user. Some of its feature highlights are:

- Uses a system board that will accommodate several different microprocessors. (See "System Board Features" on page 1-6.)
- Can house a variety of standard-width input/output and storage devices (drives), and is designed to accept new devices as they are developed. (Standard power and signal cables, without additional adapters or cables, allow the connection of two diskette drives and two hard drives.)
- Has six full-size 16-bit ISA (AT*) bus card slots, one of which also has a 16-bit VESA** connector, in its initial configuration. (This number could change for future configurations, depending on the type of system board used.)
- Can be used as a bench-top system or rack-mounted into any standard 19-inch rack.
- Has a variety of features for data security and power management.

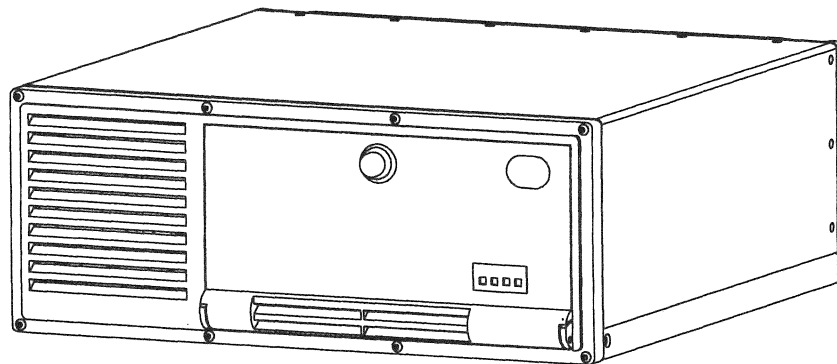


Figure 1-1. IBM 7585 Industrial Computer

General Layout of Components

Figure 1-2 (below) shows the 7585 Industrial Computer system unit with the covers removed. This figure illustrates the general layout of the system unit. This general layout is the same for all configurations, even though component units (input/output, storage, etc.) may be changed or added. Figure 1-3 on page 1-4 shows the locations of components and connectors on the current system board. Note that the locations of system board components could change with different system boards.

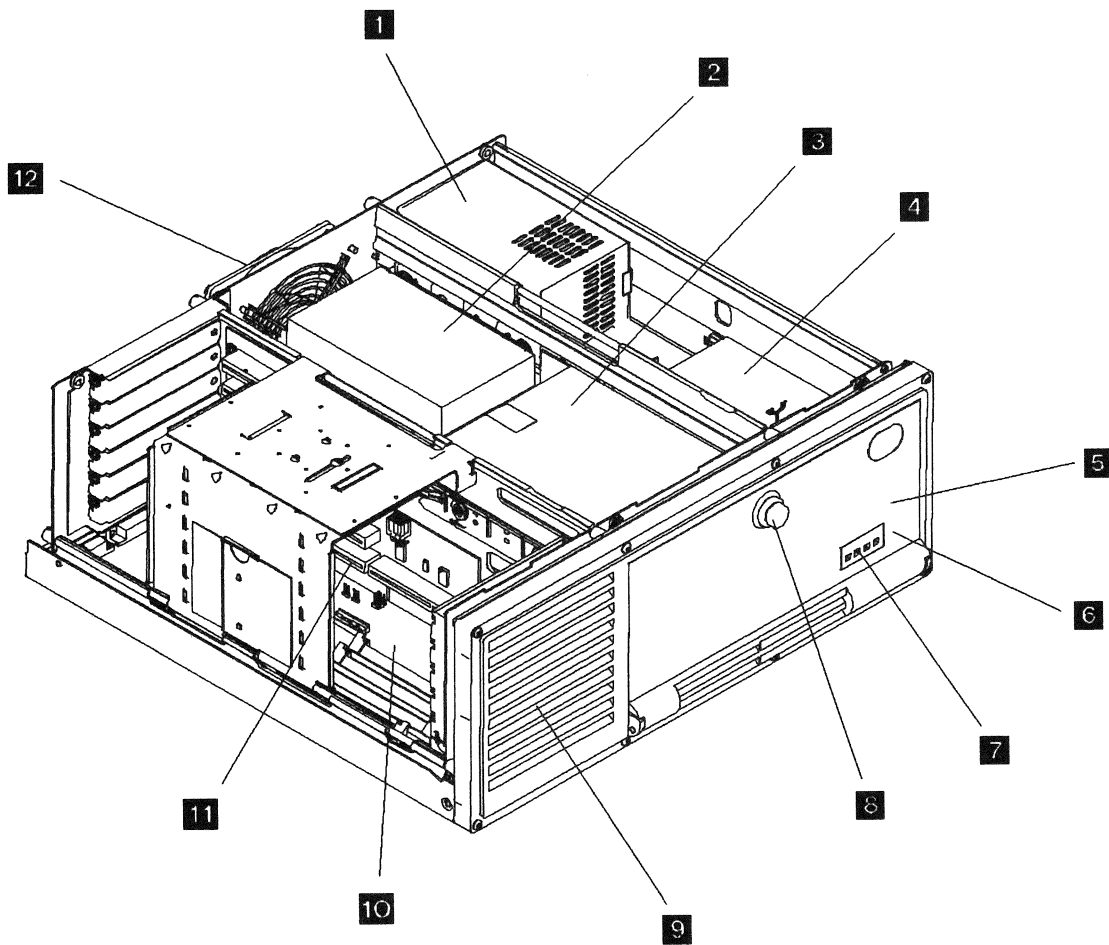


Figure 1-2. General component layout

The major components referenced in Figure 1-2 are:

- 1** Power supply
- 2** 3½ inch hard disk drive in a carrier tray and mounted in a 5¼ inch bay
- 3** 5¼ inch drive (either input/output or storage) mounted in a 5¼ inch bay
- 4** 3½ inch diskette drive mounted in a 3½ inch bay
- 5** Power switch (behind access door)
- 6** Speaker (inside system unit in front bay)
- 7** LEDs (showing through front access door)
- 8** Access door latch
- 9** Front cooling fan and air filter
- 10** System board
- 11** Riser for feature cards (no feature cards shown)
- 12** Rear cooling fan and air filter

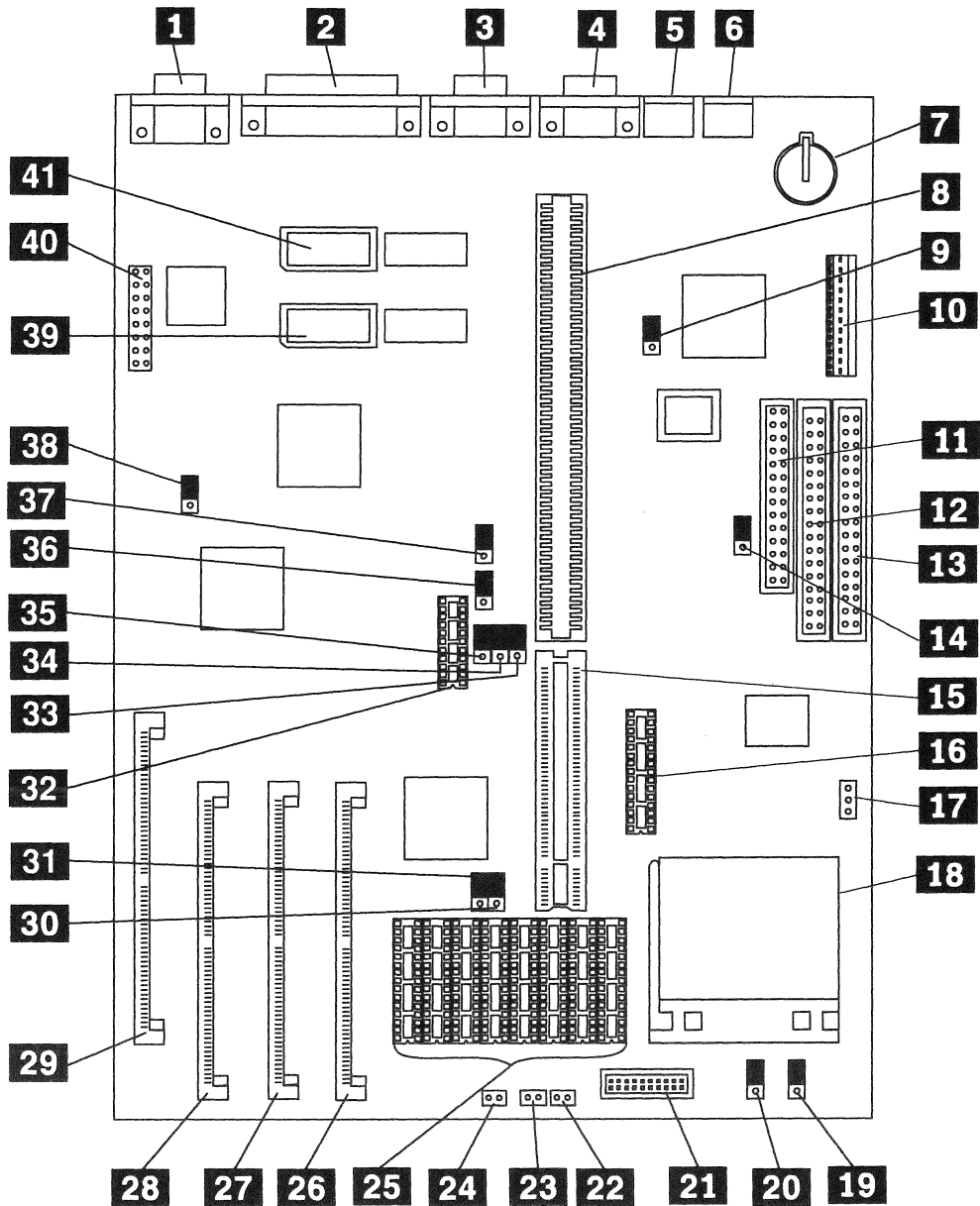


Figure 1-3. System board component locations

The major components referenced in Figure 1-3 are:

- 1 Video port connector
- 2 Parallel port connector
- 3 Serial port B connector
- 4 Serial port A connector
- 5 Mouse port connector
- 6 Keyboard port connector
- 7 Memory retention battery
- 8 Riser connector, ISA (AT) bus
- 9 Mouse disable (IRQ12) jumper
- 10 Power supply connector
- 11 Diskette drive cable connector
- 12 Hard disk drive cable connector, secondary
- 13 Hard disk drive cable connector, primary
- 14 Diskette write-protect jumper
- 15 Riser connector extension, VESA bus
- 16 Cache tag RAM connector
- 17 Microprocessor fan power connector
- 18 Microprocessor socket
- 19 SL enhanced / non-SL processor jumper
- 20 Overdrive / DX jumper (486SX / DX, DX2, DX4, P24T)
- 21 5V / 3V jumper (always installed)
- 22 Power-on LED connector
- 23 Hard disk LED connector
- 24 Speaker connector
- 25 128 / 256KB external cache connectors
- 26 Memory module connector, Bank 1
- 27 Memory module connector, Bank 2
- 28 Memory module connector, Bank 3
- 29 Memory module connector, Bank 4
- 30 128 / 256KB cache jumper
- 31 128 / 256KB cache jumper
- 32 Cache tag RAM connector
- 33 VESA / PCI jumper (VESA to rear)
- 34 VESA / PCI jumper (VESA to rear)
- 35 VESA / PCI jumper (VESA to rear)
- 36 Frequency synthesizer (microprocessor clock speed) jumper
- 37 Frequency synthesizer (microprocessor clock speed) jumper
- 38 Video enable / disable jumper
- 39 Extended video memory connector 1
- 40 Video connector (for test purposes only)
- 41 Extended video memory connector 2

System Board Features

The system board, shown in Figure 1-3 on page 1-4, is the main circuit board of the computer. It provides basic system functions for the computer and supports basic system devices, such as keyboard, display, and drives. The following list gives the primary system board features in the 7585 Industrial Computer's initial configuration:

- Either a 486SX-33 MHz, a 486DX2-66 MHz, or a 486DX4-100MHz micro-processor. (The 486DX2 and the 486DX4 contain a built-in math coprocessor.)
- The ability to use certain other upgraded microprocessors.
- A ZIF (zero insertion force) microprocessor socket for easy replacement.
- Four RAM memory sockets for industry standard 72-pin, 70-nanosecond, parity memory modules, allowing a maximum of 128MB in combinations of either 4MB, 8MB, 16MB, and 32MB memory modules.
- Sockets for up to 256KB of external (L2) cache memory.
- 1MB of video memory as standard, plus two video memory sockets, allowing a maximum of 2MB.
- The following ports: one keyboard, one mouse, one video, two serial, and one parallel.
- A 120-pin AT connector and a 12-pin VESA connector for a riser card. The riser card has six full-size AT slots, one of which also contains a VESA slot.
- A connector for up to two AT diskette drives.
- Two hard disk drive connectors, each of which can support up to two AT hard disk drives.
- A lithium battery for configuration memory retention.
- Power-on password and administrator password security features.
- Diskette write-protection security feature.
- Selectable power management features.

Specifications

Physical

Nominal physical specifications are given below. For more exact computer dimensions, refer to Appendix B, "7585 Industrial Computer Physical Dimensions" on page B-1.

- Width: 445 mm (17.5 inches)
- Depth: 444 mm (17.5 inches)
- Height: 171 mm (6.7 inches)
- Weight: 15.0 Kg (33.3 pounds) minimum
(Actual weight is dependent upon options installed.)

Power Supply

- 200 Watts Output — ac input only; voltage range manually switchable. Acceptable inputs are:
 - 100 to 125 (nominal) Volts ac; 50/60 Hz; 6 Amp (maximum)
 - 200 to 245 (nominal) Volts ac; 50/60 Hz; 3 Amp (maximum)

Note: The internal loading of the system unit must not exceed the following limits:

- +5 Vdc — 18 Amps
- +12 Vdc — 6 Amps
- 5 Vdc — 0.5 Amps
- 12 Vdc — 0.5 Amps

Heat Output

Approximate maximum heat output in British Thermal Units (BTUs) per hour.

- 200 Watt power supply — 1417 BTU/hour

Environment

- Ambient air temperature
 - Operating: 0° to 55°C (32° to 131°F)
 - Non-Operating: 0° to 60°C (32° to 140°F)
 - Shipping: -40° to 60°C (-40° to 140°F)
- Relative humidity
 - Operating: 5% to 95%
- Shock
 - Operating: 30 G, 1/2 sine wave for 3 milliseconds duration
15 G, 1/2 sine wave for 10 milliseconds duration
- Vibration
 - 5 to 500 Hz random at 0.67 G RMS
- IEC standard compliance
 - Electromagnetic compatibility:
 - Power line harmonics (IEC 555-2/EN60555)

- Electrostatic discharge (IEC 801-2EN555101-2) Level 3, 6 kV
- Radiated electromagnetic susceptibility (IEC 801-2EN555101-3) Level 3, 10 V/m
- Fast transients/bursts on power cables (IEC 801-4) Level 3, 2 kV
- Power line surges (IEC 801-5) Level 3, 1 kV
- Conducted immunity (IEC 801-6) Level 3

Option Overview

This overview can help you understand what options you can add to your computer and where you can add them. It also can help you select the options that are right for you.

RAM Memory

Adding RAM memory to your computer is an easy way to make programs run faster. You can increase the amount of memory in your computer by installing options called *memory module kits* on your system board.

Cache Memory

Adding cache memory to your computer is an effective way to make programs run faster. If your computer does not already have its maximum amount of cache memory installed, you can expand it by installing a *cache memory kit*.

Video Memory

Adding video memory allows your computer to display more colors at perceived higher resolution. If your computer does not already have its maximum amount of video memory installed, you can expand it by installing a video memory upgrade option on the system board.

Microprocessor

Some configurations of the 7585 Industrial Computer offer microprocessor upgrades. This allows you to improve the performance and capability of your computer without changing your entire system board. The microprocessor upgrade options available to you depend on the microprocessor currently installed in your computer. You should contact your IBM Authorized Dealer or Marketing Representative for information about the latest microprocessor upgrades.

Adapters

Adding an adapter, such as communications, extends the capabilities and power of your computer. You can install up to six adapters into connectors called *expansion slots*. The expansion slots are numbered on the back of the computer.

Drives

Drives are devices that computers use to read and store data. Several types of drives are available, such as:

- CD-ROM
- Diskette
- Hard disk

Adding different types of drives enables you to read other types of media, and it provides more storage for your computer. Internal drives are installed in *bays*.

Important: Some drives do not meet the industrially rated environmental specifications of the 7585 Industrial Computer. Before installing any drive that is not purchased from IBM or an IBM distributor specifically for use in a 7585, be sure that the drive's specifications meet all environmental conditions to which it might be subjected.

Drive Sizes and Mountings

Drives come in two widths and several different heights. The 7585 Industrial Computer is designed to accommodate a wide variety of drive sizes internally.

Different types of hardware (*slide rails, trays, and shock mounts*) are used to install a drive in a bay. The type of drive and its physical size determine exactly what combination of hardware you will need, but all drives must ultimately be installed in the 7585 with specially designed mounting rails, which are orderable in mounting kits.

Cover Plates (Bezels)

Cover plates, sometimes called *bezels*, cover the front of each drive that is installed in a front bay. The computer comes with blank bezels covering empty front bays. If you install a drive that has removable media (diskette, CD, etc.), you will need to change the cover plate.

Cables

Internal and external drives connect to your computer with cables. Your computer has three types of *internal* drive cables:

- A flat-ribbon signal cable from the system board connects internal diskette drives. The cable has two connectors, each of which may be attached to a diskette drive.

Warning: Do not attempt to use this cable for attaching a CD-ROM drive, even though the connectors appear to match. This cable is not intended for attaching CD-ROM drives, and serious damage to the drive could result. If you want to attach a CD-ROM drive, you must install a CD-ROM adapter.

- A second flat-ribbon cable from the system board (slightly wider than the diskette drive cable) connects internal hard disk drives. This cable has two connectors, each of which may be attached to a hard disk drive.
- A 4-wire power cable connects to each drive that has a power-cable connector. (Different drives may use two different types of connector.)

Integrated Drive Electronics (IDE) Controller

The system board in the initial model of 7585 Industrial Computer has a built-in *integrated drive electronics* (commonly called "IDE") controller that is capable of managing up to four hard disk drives. Thus no IDE controller adapter is required.

Note: The hard drive signal cable that is provided as standard with the 7585 will connect up to two hard drives. To connect a third and fourth hard drive, a second signal cable is required.

Small Computer System Interface (SCSI) Drives

Some drives have a special design called *small computer system interface*, or "SCSI." This design allows you to attach multiple drives to a single SCSI controller adapter card. Some SCSI controllers have both an internal and external connector for connecting SCSI devices.

Note: All information about SCSI drives in the following pages also applies to other SCSI devices, such as scanners and printers.

By *chaining* drives (connecting them together with cables), you can attach up to seven SCSI drives to a single controller. Each SCSI drive connected to the controller must be assigned a unique identification (ID) so the controller can identify the drives. The controller can thus communicate with a specific drive. For information about setting a SCSI ID, refer to the instructions that came with your SCSI drive.

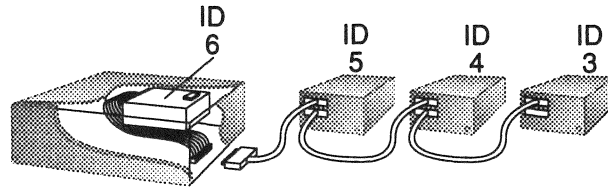


Figure 1-4. Chained SCSI devices, each with a unique ID

When SCSI drives are chained, the drives on both the internal and external end of the chain require a *terminator*. The purpose of these terminators is to ensure that the quality of the signal is maintained throughout the SCSI chain.

SCSI connectors have a built-in terminator, which is automatically enabled when nothing is attached to it. When a SCSI drive is attached to the connector, the built-in terminator is automatically disabled, and a terminator must be installed on the external drive. (Refer to the instructions that came with the drive for more information about terminators.)

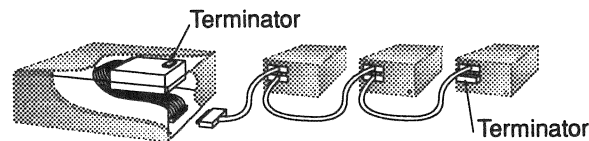


Figure 1-5. SCSI terminators

If you attach *external* SCSI drives to your computer, you should purchase the cables when you buy the drives. Your IBM Authorized Dealer or Marketing Representative can help you select the correct cables.

If you plan to install more than three external SCSI drives, be aware that the combined length of all SCSI cables (internal and external) cannot exceed 6 meters (20 feet). Refer to Table 1-1 for cable lengths.

<i>Table 1-1. SCSI cable lengths</i>	
Hardware	Approximate Lengths
7585 internal SCSI cable to internal devices (Different cables may be used.)	Measure cable actually used.
SCSI Storage Enclosure, Model 3510 (internal SCSI cable)	0.3 meters (13 inches)
External Storage Enclosure for SCSI Devices, Model 3511 (internal SCSI cable)	1.3 meters (52 inches)
SCSI Card-to-Option Cable (60-to-50-pin external SCSI cable)	1.5 meters (58 inches)
SCSI Option-to-Option Cable (50-to-50-pin external SCSI cable)	0.7 meters (27 inches)
SCSI Controller Cable (for 3532), 60-to-50-pin dual-connector external SCSI cable	1.5 meters (58 inches)
SCSI Device-to-Device Cable (for 3532), 50-to-50-pin dual- connector External SCSI cable	0.66 meters (26 inches)

Notes:


1. The IBM Model 3510 SCSI Storage Enclosure holds one SCSI device.
2. The IBM Model 3511 External Storage Enclosure for SCSI Devices can hold up to seven SCSI devices.
3. The IBM Model 3532 is a 2.3GB external SCSI tape drive.

If you plan to install:

- An external diskette drive, you can connect it by using an adapter.
- More than seven SCSI drives, you can connect them by using an additional SCSI adapter.
- More than one SCSI adapter in your computer, there could be special considerations involved. You should consult your SCSI adapter documentation.


Keyboard

A keyboard is used to enter data into a computer. A variety of keyboards is available. Adding the proper keyboard for your specific needs is an easy way to improve the usability of the computer.

A keyboard attaches to a connector at the back of the computer. The connector has an icon of a keyboard () above it.


Pointing Devices

A pointing device, such as a mouse, trackball, or light pen, is a device used to move the cursor or pointer around the screen. Adding a pointing device to your computer can make some programs easier to use.

A pointing device attaches to a connector at the back of the computer. The connector has an icon of a computer mouse () above it.

Parallel Devices


A parallel device, such as a printer or plotter, is one that transfers data eight bits at a time. Many different parallel printers, plotters, and other devices are available for your computer.

A parallel device attaches to a connector at the back of the computer. The connector has an icon of a printer () above it.

If you want to attach more parallel devices to your computer, you can install parallel adapters in the expansion slots, and then attach the devices to the adapters.

Serial Devices


A serial device, such as a pointing device or a modem, is one that transfers data one bit at a time. You can choose from a variety of such devices to attach to your computer.

Two 9-pin serial connectors are on the back of your computer. These connectors have an icon that represents serial processing () above them.

Note: If your serial device has a 25-pin connector, you will need a 9-to-25 pin cable adapter to connect the device to your computer.

If you want to attach more than two serial devices to your computer, you can install serial adapters in the expansion slots, and then attach the devices to the adapters.

Displays

A variety of displays is available for your computer. You should choose one that best suits your needs. A display attaches to a system board connector on the back of the computer. (No video adapter is required.) The connector has an icon of a display () above it.

If you want to attach more than one display, you can install a video adapter in an expansion slot, and then connect a display to the adapter. In this case, the display attached to the video connector on the system board is always the primary display.

If you want to attach only a display that is not supported by the built-in adapter, you can install a video adapter in an expansion slot and connect that display to the adapter. In this case, a system board jumper must be changed.

Chapter 2. Installing Your Computer

This chapter provides instructions to help you set up your 7585 Industrial Computer. For complete computer dimensions, refer to Appendix B, "7585 Industrial Computer Physical Dimensions" on page B-1.

Before You Begin:

- Make sure you know the correct voltage setting for your country. If you are not sure of the voltage setting for your country, contact your place of purchase.
- Make sure you have an adequate number of properly grounded electrical outlets for your computer, display, and printer.
- Plan to place your computer in a location that is dry and as clean as possible. Contaminants could cause damage to the computer.
- Plan to leave enough space around the computer to allow the computer cooling system to work properly.
- Plan to leave enough space around the computer to allow for proper service access. (This space will vary, depending on the type of mounting to be used.)
- Have this publication handy in case you need additional information.
- Have blank diskettes available to back up utility and startup programs.

Step 1. Unpack Your Computer

CAUTION:

To avoid possible injury while moving or lifting the computer, ask another person to help you.

Remove the 7585 Industrial Computer from its shipping carton, along with all other materials in that carton. Also unpack all devices to be externally attached to the computer — for example: power cord, keyboard, monitor, printer, mouse, and cables. (To prevent possible damage, do not unpack delicate internal components yet. Unpack them when you are ready to install them.)

If any items are missing, contact your place of purchase.

Step 2. Check the Voltage Setting

The power supply on the 7585 Industrial Computer has a switch on it which must be manually set before the computer is powered up. The switch is located in the area where the power cord plugs into the system unit. It is marked either "110/220" or "115/230."

Use the following instructions to set the switch. You may use a ball-point pen to slide the switch to the correct position.

- If the voltage range in your country is between 90 and 137 volts, set the switch so that "110" or "115" is visible.
- If the voltage range in your country is between 180 and 265 volts, set the switch so that "220" or "230" is visible.

Warning: Be sure the voltage-selection switch is in the correct position. If you set this switch to the wrong position, you might damage your computer when you turn it on.

Step 3. Install Internal Options

Internal options are devices that are installed inside your computer. Some internal options are mounted directly to the system board, such as memory modules (SIMMs), cache memory, and video memory. Other internal options are installed in the drive bays, such as diskette drives, hard disk drives, etc.. Adapters, or feature cards, which are mounted on the system board riser card, are also internal options.

- **If you do not have any options to install inside your computer**, proceed directly to “Step 4. Mount the Computer” on page 2-4.
- **If you have options to install but you want to check out your system before installing the options**, you may do so now by skipping to “Step 5. Connect the Cables” on page 2-7. You will have to connect the display, keyboard, and power cable and then run the Configuration program. (You will, of course, need to re-run the Configuration program after the options are installed.)
- **If you have any options to install inside your computer**, you should install them now, before the system is mounted or cables are attached. For option installation instructions, use the appropriate procedures in Chapter 3, “Installing Options.”

Note: As you install the options, be sure to record all pertinent information such as drive types and sizes, memory sizes, identification numbers, etc. in Appendix A, “System Records.”

After you install all internal options, return to this procedure.

Step 4. Mount the Computer

Your 7585 Industrial Computer can be used free-standing or mounted in a rack. The computer has standardized mounting holes on the bottom and on the front for convenient mounting.

If you use the bottom holes to mount your computer on rails for rack-mounting, use the following general instructions:

- Use the standardized holes in the bottom cover for mounting the computer. In the 7585 Industrial Computer, those holes are countersunk on the inside to accommodate flat-head screws only.
- Always install the screws from the inside of the computer — that is, pointing downward — with the nuts on the outside.
- If possible, use only flat-head M6 screws.
- If it is not possible to use flat-head M6 screws, you may use other flat-head screws, as long as the heads do not protrude above the countersunk holes.

Warning: Failure to adhere to the above instructions will prevent proper servicing and could cause damage to the computer.

Free-Standing

If your computer is to be used free-standing, ensure that it is firmly resting on all four padded feet to reduce vibration. Proceed to “Step 5. Connect the Cables” on page 2-7.

Rack-Mount Setup with Slide Rails

Use the following procedure to rack-mount the system unit when slide rails are to be installed.

1. Unscrew the two knurled thumbscrews near the top on the back of the system unit, until they release. (The two thumbscrews are retained inside the top cover; they will not come out.)
2. Slide the top cover toward the back and then lift it off.
3. Unscrew the four knurled thumbscrews on the back of the system unit, until they release.
4. Slide the chassis with its components toward the back until the mounting holes are accessible.

Note: It is usually easier to slide the chassis all the way back and totally remove it, setting it aside temporarily. However, if you do remove the chassis, be sure that your system will be mounted with enough back clearance so that you can reinstall the chassis into the bottom cover after the cover is fastened to the rack.

5. Align the rails' mounting holes under the system unit's mounting holes.
6. Insert the flat-head M6 screws into the countersunk holes in the bottom cover of the system unit and then through the holes in the rails.
7. Install the washers and nuts onto the M6 screws.
8. Reinsert the chassis, if it was removed, and slide it to the front.
9. Screw in the four knurled thumbscrews on the back of the system unit, until they are snug.
10. Place the top cover on the system unit, slide it forward, and screw in the two knurled thumbscrews.
11. Use the eight Allen head screws provided in the rack mounting kit to install the rack's front plate assembly onto the front bezel of the computer.
12. If you are to use a spacer plate beneath the front bezel, install it with the hardware provided.
13. After you install the mating slide rail hardware within the rack, mount the system unit into the rack so that the rails engage and slide freely.
14. Slide the system unit all the way in and install the four screws provided through the front rack plate and into the rack frame.
15. Proceed to "Step 5. Connect the Cables" on page 2-7.

Rack-Mount Setup without Slide Rails

Use the following procedure to rack-mount the system unit when slide rails are not to be installed. The computer system unit does not need to be opened for this procedure.

Warning: When rack-mounting the system unit without slide rails, appropriate hardware must be used to support the system unit from underneath, to prevent damage to the system unit. Full support on both sides is best; at minimum, support in all four corners is a necessity. Appropriate mounting hardware must also be used to support the display and the keyboard, if they are also rack-mounted.

1. Unscrew the eight Allen head screws from the front of the system unit, and use them to install the rack's front plate assembly onto the front bezel of the computer.
2. If you are to use a spacer plate beneath the front bezel, install it with the hardware provided.
3. After you install the angle-irons securely within the rack, mount the system unit into the rack so that it can slide freely on the angle-irons.
4. Slide the system unit all the way in and install the four screws provided through the front rack plate and into the rack frame.
5. Proceed to "Step 5. Connect the Cables" on page 2-7.

Step 5. Connect the Cables

Connect all computer system cables in the order indicated below:

1. Connect all cables between the system unit and the keyboard, the mouse, the display, and all other peripheral devices.
2. Connect the power cords (machine side only) to the system unit, the display, and all other peripheral devices.
3. Plug the power cords from the system unit, display, and other devices into properly grounded electrical outlets.

Step 6. Power-Up the Computer System and Check It Out

Warning: Before you continue, be sure to set the voltage switch on the power supply correctly for your power source, as explained in "Step 2. Check the Voltage Setting" on page 2-2. If you set it to the wrong position, you might damage your computer when you turn it on.

You should perform the following power-up and check-out procedure one time just to familiarize yourself with the power-up sequence. In this way, you will become acquainted with what messages to expect. If, however, your system has never been configured or you changed the system's configuration by adding or changing features, the screen will display an error message indicating that the configuration utility must be run. In that case, perform "Step 7. Run the Configuration Utility" on page 2-9 after performing this step once; and then perform this step again to complete the system check-out.

1. Switch on your display and adjust the Brightness and Contrast controls to the approximate midpoint. (You can readjust these controls for personal viewing comfort after you turn on your computer.)

2. Switch on the computer.

You should see the power-on light come on.

3. Continue to check your display screen and listen for audible beeps. A series of coded messages should appear on the screen. These messages are part of the normal power-on process that occurs each time you switch on the computer. Also, depending on which system board is in your system, one or more audible beeps might occur. The following should occur:

- a. A blinking cursor appears on the screen
- b. After a short time, an icon showing a computer screen appears in the upper right corner,



and the RAM memory test message appears in the upper left corner.

- c. The computer starts the power-on self test (POST).
- d. If the POST completes successfully, the amount of available memory is displayed, and a single beep occurs.
 - If the POST does complete successfully, proceed to "Step 7. Run the Configuration Utility" on page 2-9.
 - If the POST does not complete successfully, an error code is displayed. Also, either no beep or multiple beeps might occur. In this case, check the screen for the error message, and refer to Chapter 5, "Problem Solving" on page 5-1 to resolve the problem.

Note: As mentioned above, it will probably be necessary to run the configuration utility, as described in "Step 7. Run the Configuration Utility" on page 2-9 and then return to this step.

Step 7. Run the Configuration Utility

Note: This Step assumes that you have installed all options in your system, as instructed in "Step 3. Install Internal Options" on page 2-3. If you have not, install those options now. For option installation instructions, use the appropriate procedures in Chapter 3, "Installing Options."

If your computer system has never had its configuration utility run, or if you have changed the configuration by adding or changing a feature, run the configuration utility as follows:

1. Power down the computer for several seconds and then power it up again.
2. When the icon appears in the upper right corner, press the F1 key to initiate the configuration utility. Then follow the instructions on the screen to configure the system.

Step 8. Finish the Installation

Your computer hardware is now set up and you are ready to finish the installation by installing the required software and completing the paperwork. These final steps are different for various configurations and applications, but you may use the following checklist as a guide.

- Install your operating system.**
Refer to the documentation and instructions supplied with your operating system.
- Install your application programs.**
Refer to the documentation and instructions supplied with your application programs.
- Make any backup copies necessary.**
It is very important that you keep a backup copy of the system partition, reference diskette, hard files, etc., in case of possible future use.
- Record your identification numbers.**
Your computer might have important identification information that you might need if you have it serviced or if you need to order duplicate keys (for keylock-equipped systems). You should record all such information in Appendix A, "System Records" on page A-1 or in another safe place.
- Complete your registration or warranty forms.**
Complete and return the registration cards that came with your computer.

Chapter 3. Installing Options

This chapter provides instructions to help you add options to your computer — either at the time of initial system installation or at some later time. **If you have several internal options to install, you should install them all at one time, while the computer is still open. You should install all system board options first, because it might be necessary to remove feature cards and drives to access the system board.**

Use the figures at the beginning of this chapter to locate components. Before performing any installation procedures, be sure to read and understand the information in “Safety” on page xx and in “Handling Static-Sensitive Devices” on page I. That information will help you work more safely with your computer and options.

CAUTION:

Power must always be switched off before performing any removal/replacement procedures; electrical power and any backup power source should also be unplugged or otherwise disconnected. To assure that power is switched off and disconnected in the correct order, start every removal and replacement procedure with “Switching Off Power and Disconnecting Cables” on page 3-4.

CAUTION:

Depending on the options installed, this computer’s system unit could weigh more than one person can comfortably lift. Do not attempt to lift it by yourself if you think it is too heavy for you.

Warning: Whenever handling electronic components, use precautions to prevent component damage due to electrostatic discharge. Refer to “Handling Static-Sensitive Devices” on page I for a list of those precautions.

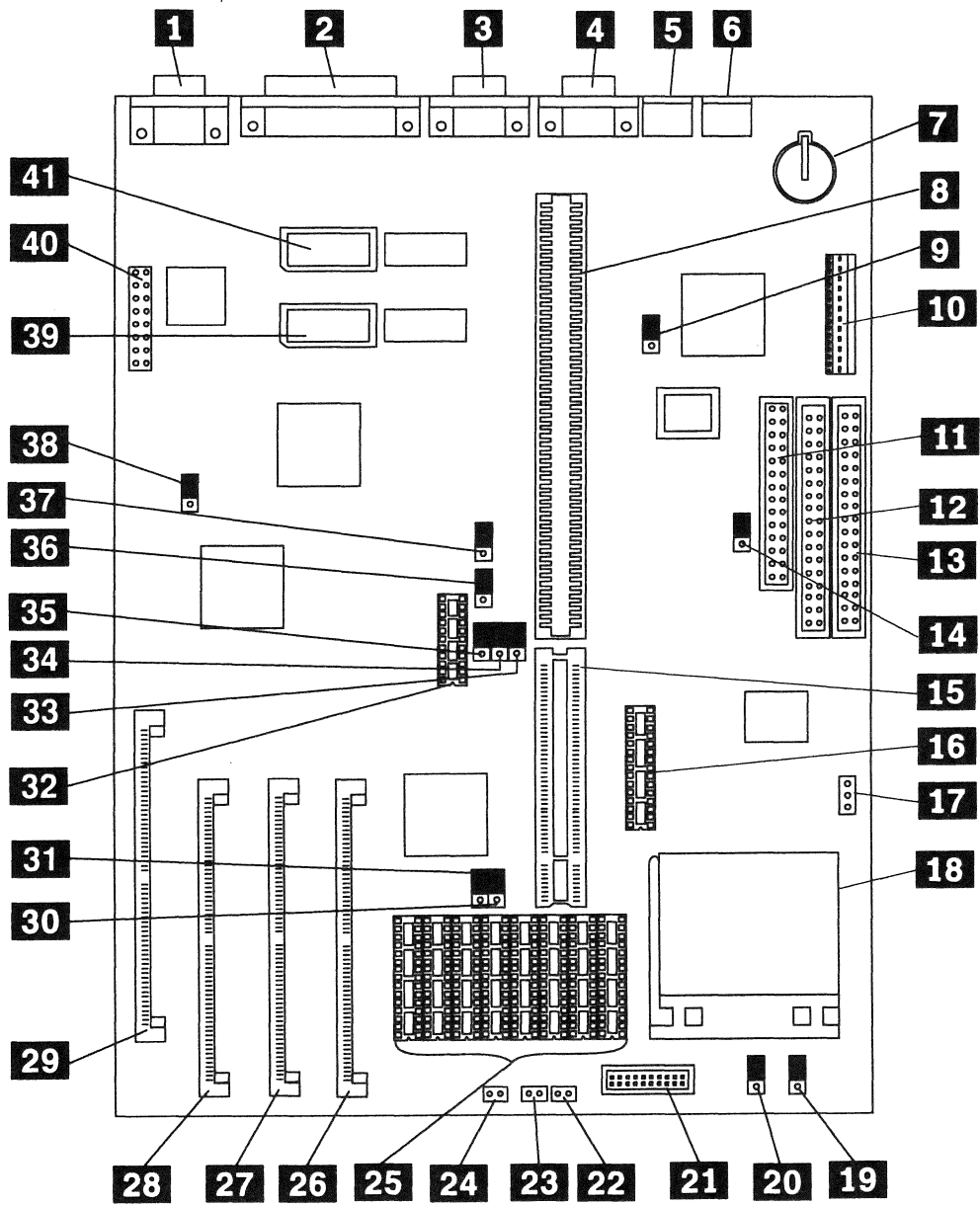


Figure 3-1. System board component locations

The major components referenced in Figure 3-1 are:

- 1 Video port connector
- 2 Parallel port connector
- 3 Serial port B connector
- 4 Serial port A connector
- 5 Mouse port connector
- 6 Keyboard port connector
- 7 Memory retention battery
- 8 Riser connector, ISA (AT) bus
- 9 Mouse disable (IRQ12) jumper
- 10 Power supply connector
- 11 Diskette drive cable connector
- 12 Hard disk drive cable connector, secondary
- 13 Hard disk drive cable connector, primary
- 14 Diskette write-protect jumper
- 15 Riser connector extension, VESA bus
- 16 Cache tag RAM connector
- 17 Microprocessor fan power connector
- 18 Microprocessor socket
- 19 SL enhanced / non-SL processor jumper
- 20 Overdrive / DX jumper (486SX / DX, DX2, DX4, P24T)
- 21 5V / 3V jumper (always installed)
- 22 Power-on LED connector
- 23 Hard disk LED connector
- 24 Speaker connector
- 25 128 / 256KB external cache connectors
- 26 Memory module connector, Bank 1
- 27 Memory module connector, Bank 2
- 28 Memory module connector, Bank 3
- 29 Memory module connector, Bank 4
- 30 128 / 256KB cache jumper
- 31 128 / 256KB cache jumper
- 32 Cache tag RAM connector
- 33 VESA / PCI jumper (VESA to rear)
- 34 VESA / PCI jumper (VESA to rear)
- 35 VESA / PCI jumper (VESA to rear)
- 36 Frequency synthesizer (microprocessor clock speed) jumper
- 37 Frequency synthesizer (microprocessor clock speed) jumper
- 38 Video enable / disable jumper
- 39 Extended video memory connector 1
- 40 Video connector (for test purposes only)
- 41 Extended video memory connector 2

Switching Off Power and Disconnecting Cables

Use the following procedure to power-down the computer system and disconnect all cables **before** beginning any removal/replacement procedure. If it is necessary to remove the system unit from its mounting place, use this procedure **before** removing the system unit.

1. Remove any data media (diskettes, CDs, optical discs, tapes, etc.) from the system unit.
2. Switch off all power to the system unit and any attached devices.
3. Tag all cables connected to the system unit or somehow note their respective connectors to prevent confusing them when they are unplugged.
4. If you have a modem or fax machine attached, disconnect the telephone line from the wall outlet and then from the computer.
5. Unplug or otherwise disconnect all electrical power and any backup power source.
6. Unplug all other cables connected to the system unit. Where applicable, unplug all cables at the receptacle end first, and then at the device end. (For D-shell connectors, remove the two screws that secure each cable to its D-shell connector, and then unplug the cable.)

You are now ready to proceed.

- For computers in which the mounting does not impede access, go directly to "Opening the System Unit" on page 3-5.
- For computers in which the mounting does impede access, go to "Removing the System Unit from its Mounting" on page 3-5.

When reassembling the computer, reverse the above steps.

Removing the System Unit from its Mounting

For some installations, the system unit is mounted in such a manner that access for replacing certain FRUs is limited. In such cases, it is easy to slide the chassis all the way back and remove it from the bottom cover before starting the FRU removal/replacement procedure. In extreme situations, it might be necessary to totally remove the system unit from its mounting place. This removal varies, depending on your particular mounting method.

Removing the System Unit from a Rack

- For **front rack** servicing, remove the four screws that secure the system unit's front bezel to the front of the rack, and slide the system unit forward with the bezel attached.
- If the system unit is **rack-mounted on sliding rails**, it cannot be removed from the rear of the rack. It must be removed from the front, and must be done with the angle-irons attached to the bottom.

Note: It might be possible to access the desired area of the computer from the rear by removing the top cover and sliding the chassis back. Refer to "Opening the System Unit"

- If the system unit is **rack mounted, but not on sliding rails**, it can be removed from the rear of the rack. Remove the eight screws that secure the system unit to the front bezel, and slide the system unit backward.

When reassembling the computer, reverse the above steps.

Opening the System Unit

Use the following procedure to open the system unit and slide the chassis back for servicing.

1. Unscrew the two knurled thumbscrews near the top on the back of the system unit, until they release. (The two thumbscrews are retained inside the top cover; they will not come out.)
2. Slide the top cover toward the back and then lift it off.

Some components are now accessible without going any further in this procedure. Access to other components will require you to remove other components that are in the way or to slide the chassis back. To slide the chassis back, continue to the next step.

3. Unscrew the four knurled thumbscrews on the back of the system unit, until they release.
4. Slide the chassis with its components toward the back.

When reassembling the computer, reverse the above steps.

RAM Memory Modules (SIMMs)

Four 72-pin connectors are available on the system board to install single in-line memory modules (SIMMs). Refer to items **26** to **29** in Figure 3-1 on page 3-2 for their exact location.

Note: If you are to install 256KB of external (L2) memory, you should do that before installing RAM memory modules.

A memory module must be installed in connector 1. Additional memory modules must be installed in connector 2, then in connector 3, then in connector 4. You may install only industry standard 72-pin, 70-nanosecond, parity memory modules, in **most** combinations of either 4MB, 8MB, 16MB, or 32MB memory modules. Refer to Table 3-1 on page 3-7 for the acceptable memory-module kit combinations. The combinations given in that table are the **only** combinations of memory-module kits that can be installed.

To install RAM memory module(s):

1. Remove the system unit's cover, as described in "Opening the System Unit" on page 3-5.
2. Locate the memory module socket(s).
3. If any installed adapters or drives are in the way, note their locations and any cables that are connected to them. Then remove the adapter(s) or drive(s).
4. Touch the static-protective bag in which the module was packaged to any unpainted metal surface on the computer. Then remove the memory module from the package.
5. The memory module sockets are numbered MEM1 to MEM4 on the system board. **Install all memory modules only in the acceptable combinations found in to Table 3-1 on page 3-7. Be sure that each module is oriented with its notch toward the rear of the system board.** To install a memory module:
 - a. Insert its connector edge straight into the socket.
 - b. Press down on it to assure good contact.
 - c. Pivot the top edge back until it latches into place.
6. Reinstall any removed adapters or drives into their original positions.
7. Slide the chassis forward and fasten the four knurled thumbscrews that secure it.
8. Reinstall the cover.
9. Record the combination of RAM memory you just installed in Appendix A, "System Records."

Table 3-1. Acceptable system memory combinations

Total Memory	MEM 1	MEM 2	MEM 3	MEM 4
4MB	4MB	–	–	–
8MB	4MB	4MB	–	–
8MB	8MB	–	–	–
12MB	4MB	4MB	4MB	–
12MB	4MB	8MB	–	–
16MB	16MB	–	–	–
16MB	4MB	4MB	8MB	–
16MB	8MB	8MB	–	–
16MB	4MB	4MB	4MB	4MB
20MB	4MB	8MB	8MB	–
20MB	4MB	16MB	–	–
24MB	8MB	8MB	8MB	–
24MB	4MB	4MB	8MB	8MB
24MB	4MB	4MB	16MB	–
28MB	4MB	8MB	8MB	8MB
28MB	4MB	4MB	16MB	4MB
32MB	16MB	16MB	–	–
32MB	32MB	–	–	–
32MB	8MB	8MB	16MB	–
32MB	8MB	8MB	8MB	8MB
36MB	4MB	16MB	16MB	–
40MB	4MB	4MB	32MB	–
40MB	4MB	4MB	16MB	16MB
48MB	16MB	16MB	16MB	–
48MB	8MB	8MB	32MB	–
48MB	8MB	8MB	16MB	16MB
52MB	4MB	16MB	16MB	16MB
64MB	32MB	32MB	–	–
64MB	16MB	16MB	32MB	–
64MB	16MB	16MB	16MB	16MB
68MB	4MB	32MB	16MB	16MB
72MB	4MB	4MB	32MB	32MB
80MB	8MB	8MB	32MB	32MB
84MB	4MB	32MB	32MB	16MB
96MB	32MB	32MB	32MB	–
96MB	16MB	16MB	32MB	32MB
100MB	4MB	32MB	32MB	32MB
128MB	32MB	32MB	32MB	32MB

Cache Memory Modules

The cache (L2) memory modules are located on the system board. Refer to items **25**, **16**, and **32** in Figure 3-1 on page 3-2 for the exact location of the cache memory modules to be installed in your computer. Refer also to items **30** and **31** in the same figure for the location of the cache jumpers.

External cache memory feature options are available in two different feature kits:

- The 128KB kit upgrades from no external cache memory to 128KB. (The 128KB kit contains six modules.)
- The 256KB kit upgrades from 128KB to 256KB; you must first have the 128KB kit. (The 256 kit contains four modules.)

To install cache memory modules:

1. Remove the system unit's cover, as described in "Opening the System Unit" on page 3-5.
2. Locate the memory module sockets. Refer to items **25**, **16**, and **32** in Figure 3-1 on page 3-2.
3. If any installed adapters or drives are in the way, note their locations and any cables that are connected to them. Then remove the adapter(s) or drive(s).
4. If any RAM memory modules (SIMMs) are already installed and you are installing 256KB of cache memory, note the respective locations of the RAM memory modules, and then remove them.
5. Touch the static-protective bag in which the modules were packaged to any unpainted metal surface on the computer. Then remove the memory modules from the package.
6. Install the new memory modules into the empty sockets as follows:
 - For either 128KB or 256KB of cache memory, always populate sockets **16** and **32** both.
 - For 128KB, populate the four sockets in item **25** that are closest to the processor.
 - For 256KB, populate all eight sockets in item **25**.

When installing the modules, be sure that all of the modules are oriented so that their notches align with the notches in their sockets (toward the front of the system board).

7. Set the cache jumpers, items **30** and **31** in Figure 3-1 on page 3-2, for the amount of cache installed:
 - 128KB — both jumpers toward the back of the board.
 - 256KB — both jumpers toward the front of the board.
8. If you removed the RAM memory modules, reinstall them into their original positions.
9. Reinstall any removed adapters or drives into their original positions.
10. Slide the chassis forward and fasten the four knurled thumbscrews that secure it.
11. Reinstall the cover.

12. Record the size of cache memory you just installed in Appendix A, "System Records."

Video Memory Modules

The video memory modules are located on the system board. Refer to items **39** and **41** in Figure 3-1 on page 3-2 for the exact location of the video memory module(s) to be installed in your computer.

To install video memory module(s):

1. Remove the system unit's cover, as described in "Opening the System Unit" on page 3-5.
2. Locate the video memory module socket(s).
3. If any installed adapters or drives are in the way, note their locations and any cables that are connected to them. Then remove the adapter(s) or drive(s).
4. Touch the static-protective bag in which the modules were packaged to any unpainted metal surface on the computer. Then remove the memory modules from the package.
5. Install the new memory modules into the empty sockets. **Be sure that they are oriented so that their bevels, dots, or other distinguishing marks align with the bevels in their sockets (toward the front of the system board).**
6. Reinstall any removed adapters or drives into their original positions.
7. Slide the chassis forward and fasten the four knurled thumbscrews that secure it.
8. Reinstall the cover.
9. Record the size of video memory you just installed in Appendix A, "System Records."

Adapters

To install an adapter:

1. Remove the system unit's cover, as described in "Opening the System Unit" on page 3-5.
2. Read the instructions that came with the adapter to determine if the adapter must be installed in a certain slot. If not, you may use any empty slot. Determine which empty slot you will use.
3. Note the locations of any installed adapters or drives that are in the way, and then remove them.
4. Open the adapter card retainer as follows:
 - a. Loosen the two screws on the side latch and the larger screw on the top.
 - b. Slide the side latch up to disengage it.
 - c. Extend the retainer side piece straight out and pivot the retainer up and out of the way.
5. Remove the expansion slot cover (one screw) and save it.
6. Read the instructions that came with the adapter to determine if you must set any switches, jumpers, etc. on the adapter.
7. Touch the static-protective bag in which the adapter was packaged to any unpainted metal surface on the computer. Then remove the adapter from the package.
8. Set any required switches, jumpers, etc. on the adapter. Also, install any required memory modules on it.
9. Install the adapter as follows:
 - a. Grasp the adapter at the front and rear.
 - b. Align the adapter with the front and rear adapter guides and slide it into the guides. (Some adapters are shorter and do not extend to the front adapter guide.)
 - c. Press the adapter *firmly* into the expansion slot. Full-length adapters slide into the latch on the front adapter guide.
 - d. Install and tighten the expansion slot screw.
10. Reinstall any removed adapters into their original slots.
11. Move the adapter card retainer back into place, making sure that the card retainer blocks engage the adapter cards firmly. Then close the retainer latch and tighten the three screws previously loosened.
12. Slide the chassis forward and fasten the four knurled thumbscrews that secure it.
13. Reinstall the cover.
14. Record the type of adapter you just installed in Appendix A, "System Records."

Internal Drives

This generalized mounting procedure applies for all different types of internal drives — diskette, hard disk, CD-ROM, etc. Different types of hardware (*slide rails, trays, and shock mounts*) are used to install a drive in a bay. The type of drive and its physical size determine exactly what combination of hardware you will need; however, all drives must be installed in the 7585 with specially designed mounting rails that come with supported drives or are orderable in mounting kits.

Important: Some drives do not meet the industrially rated environmental specifications of the 7585 Industrial Computer. Before installing any drive that is not purchased from IBM or an IBM distributor specifically for use in a 7585, be sure that the drive's specifications meet all environmental conditions to which it might be subjected.

Warning: If you are installing a CD-ROM drive, do not attempt to use the diskette drive signal cable for attaching the CD-ROM drive, even though the connectors appear to match. That cable is not intended for attaching CD-ROM drives, and serious damage to the drive could result. If you want to attach a CD-ROM drive, you must install an appropriate adapter (CD-ROM, SCSI, etc.).

To install an internal drive

1. Remove the system unit's cover and slide the chassis back, as described in "Opening the System Unit" on page 3-5.

2. Determine into which drive bay the new drive will be installed.

Note: If other existing drives are blocking access to that bay, they will have to be temporarily removed. That will be done in a later step in this procedure.

3. If the drive to be installed has removable media, remove the appropriate blank cover plate from the front of the computer. It must be replaced with a new drive cover plate.

Note: If the new drive comes with a second, different color, bezel or cover plate, be sure to install the matching plate. In some cases, the plate must be installed on the drive before the drive is installed in the computer.

4. Read the instructions that came with the drive to determine any special instructions for:

- Installing or changing drive installation hardware
- Setting jumpers or switches
- Removing or installing a terminator
- Setting a unique drive ID (SCSI drives only)

5. **You must use mounting hardware specifically designed for use in a 7585.** Such hardware is available in a 7585 drive mounting kit feature, or in some cases, is provided with supported drive features. Do not attempt to use mounting hardware that came with your drive unless it was specifically designed for use in a 7585. Install the appropriate hardware on the new drive as follows:

Direction of drive connectors and mounting rail latches:

- **If the new drive is to be used in a rear drive bay,** prepare to install it with its cable connectors toward the front of the system unit. Prepare also

to attach the rails to the drive so that their latches are toward the front of the system unit too.

- **If the new drive is to be used in a front drive bay**, prepare to install it with its cable connectors toward the rear of the system unit. Prepare also to attach the rails to the drive so that their latches are toward the rear of the system unit too.

Installing the rails:

Note: The rails and other mounting kit hardware are designed with different sets of holes to accommodate many different drive hole configurations. You should use the holes that best suit your particular combination of drives.

- **To install a 3½ inch drive into a 3½ inch bay**, use the mounting kit for a 3½ inch bay. Refer to Figure 3-2 on page 3-14. Attach the two slide rails with the four screws provided in the mounting kit. (Shock mounting is not possible with this combination.)
 - **To install a 5¼ inch drive into a 5¼ inch bay**, use the mounting kit for a 5¼ inch bay. Refer to Figure 3-3 on page 3-15. Attach the slide rails to the drive with the grommets, bushings, spacers, and flathead screws provided in the mounting kit. (Thus, all 5¼ inch drives are shock mounted.)
 - **To install a 3½ inch drive into a 5¼ inch bay**, use the mounting kit for a 5¼ inch bay. Refer to Figure 3-4 on page 3-16. First attach the slide rails to the two L-shaped brackets with the grommets, bushings, spacers, and flathead screws provided in the mounting kit. Then attach the drive to the carrier tray with four screws provided. Finally, attach the carrier tray between the L-shaped brackets. (This combination is useful for shock mounting a 3½ inch drive.)
6. Remove the two screws securing the internal front fascia at the top, and pivot the fascia forward to disengage it from the front of the chassis. Set the fascia out of the way. (The wires are long enough so that they may remain connected.)
 7. If another existing drive is blocking access to the bay where the new drive is to be installed, temporarily remove it as follows:
 - a. Disconnect all cables to it.
 - b. Slide the drive out the front of the computer. A front-mounted drive will slide out easily; for a rear-mounted drive, you must release the mounting rail latches that secure it on each side.
 8. Slide the new drive through the front of the computer and into the selected bay until its rail latches detent into place.
 9. Connect the signal cable(s) to the new drive. (Cable connectors are keyed and connect only one way.)
 10. Connect the four-wire power supply cable, if required, to the drive.
 11. Reinstall any drives that were temporarily removed, and connect their cables, just as you did with the new drive.
 12. Reinstall the internal front fascia assembly as follows:
 - a. Insert the two feet of the fascia into their slots in the chassis.
 - b. Pivot the fascia upward to its normal position.
 - c. Install the two screws securing the top of the fascia.

13. If the drive you installed came with a special cover plate for removable media, install that cover plate in place of the one you removed.
14. Slide the chassis forward and fasten the four knurled thumbscrews that secure it.
15. Reinstall the cover.
16. Record the type of drive you just installed in Appendix A, "System Records."

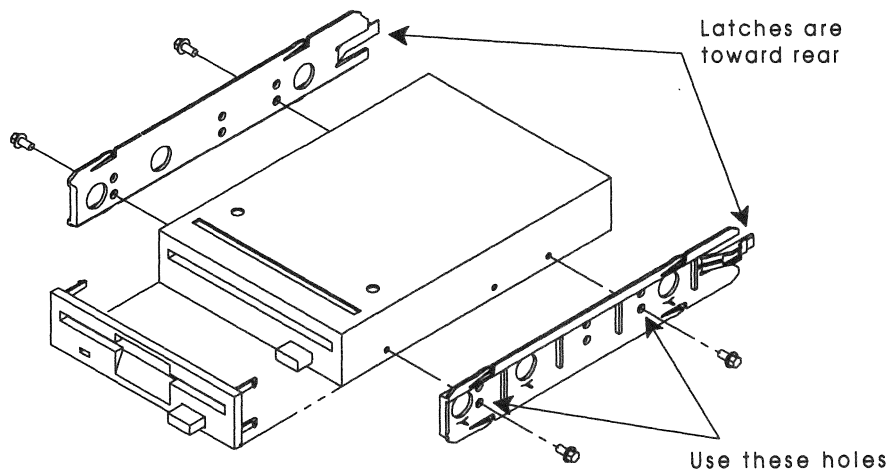


Figure 3-2. Diskette drive installation

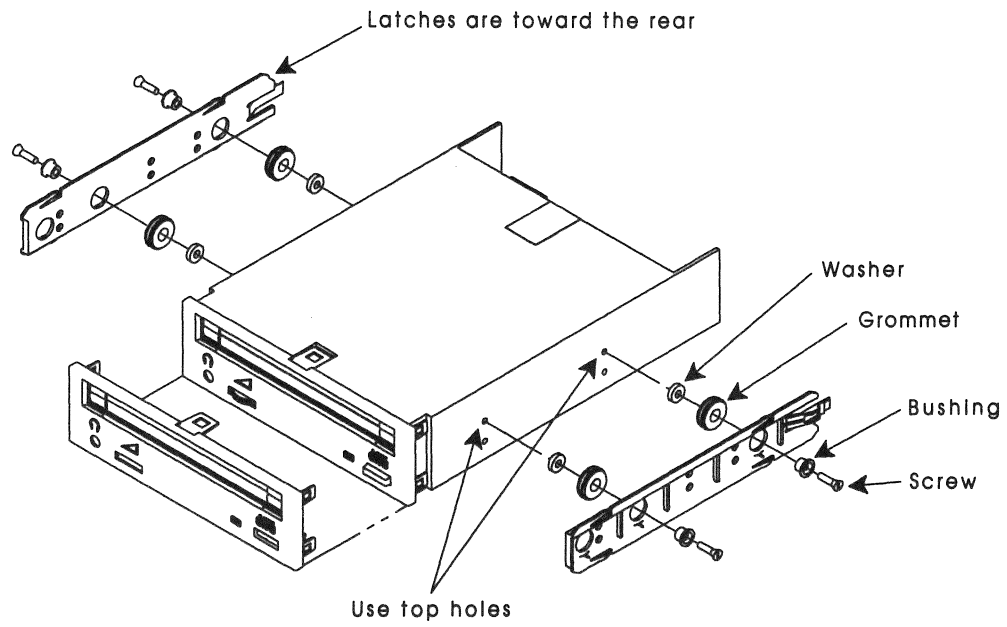


Figure 3-3. CD-ROM drive installation

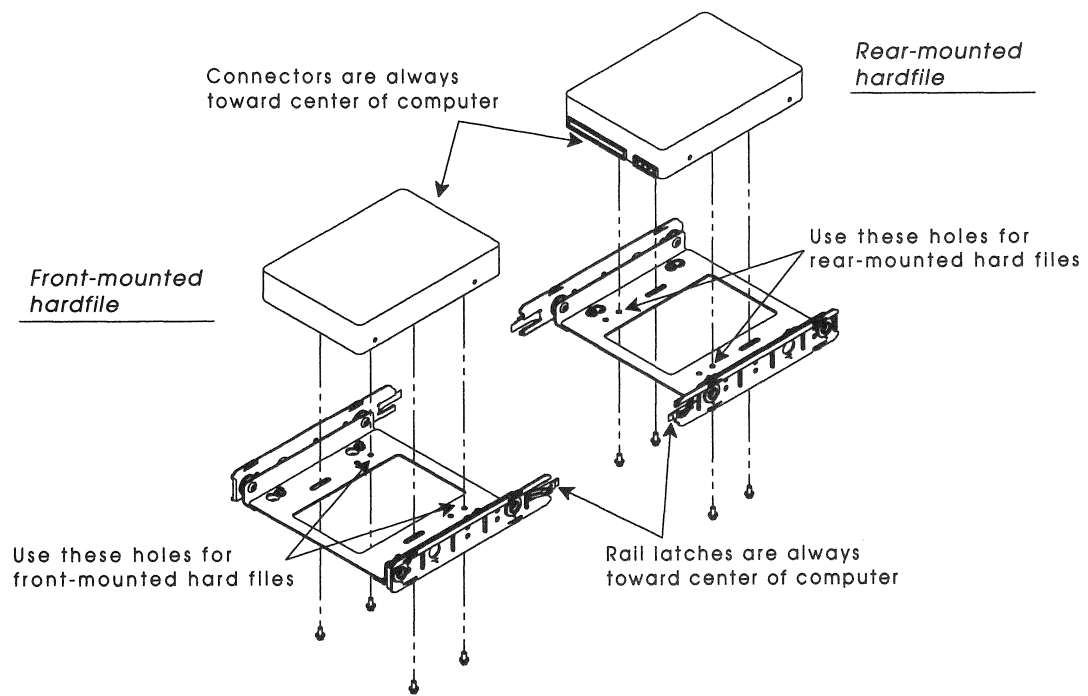


Figure 3-4. Hard disk drive installation

Chapter 4. Operating Instructions

The operation of your IBM 7585 Industrial Computer depends primarily upon the system board, system configuration, operating system, and application programs in your particular computer. This chapter is very general in its instructions, dealing primarily with instructions for the currently available system boards. Future system boards and power supplies could operate differently.

Controls

Front Access Door

A bottom-hinged access door on the front of the 7585 covers the power switch, LEDs, and removable media drives. The door has a rubber seal to prevent dust from entering through the door. Thus it should be kept closed when possible. When the door is closed, the LEDs are still visible through windows in the door.

To open the front access door, simply turn its knurled knob one-quarter turn to the right and pull. Then, to close the door, pivot it up and latch it by turning its knurled knob one-quarter turn to the left.

Power Switch

The power switch is located inside the front access door. It is a rocker type switch with the standardized markings **O** for off and **|** for on.

Light-Emitting Diodes (LEDs)

The 7585 has four light-emitting diodes (LEDs) located inside the front access door:

- The leftmost (green) LED indicates that power is on.
- The next (yellow) LED indicates that a hard drive is reading or writing data.
- The rightmost two (yellow) LEDs are not used for any prescribed purpose; they may be connected for user applications where signals are required. Their connector is behind the LEDs.



Figure 4-1. Power switch and LEDs

Power Supply

The power supply on the 7585 Industrial Computer has a switch on it which must be manually set before the computer is powered up. The switch is located in the area where the power cord plugs into the system unit. It is marked either "110/220" or "115/230."

Use the following instructions to set the switch. You may use a ball-point pen to slide the switch to the correct position.

- If the voltage range in your country is between 90 and 137 volts, set the switch so that "110" or "115" is visible.
- If the voltage range in your country is between 180 and 265 volts, set the switch so that "220" or "230" is visible.

Warning: Be sure the voltage-selection switch is in the correct position. If you set this switch to the wrong position, you might damage your computer when you turn it on.

Prior to Initial Power-Up

Before attempting to power-up your computer system, ensure that all of the following conditions are met:

- All internal and external options are properly installed.
- All power supply switches are set correctly for your power source. Refer to "Power Supply" and to "Step 2. Check the Voltage Setting" on page 2-2.
- All signal cables are properly connected.
- All power cables are plugged into grounded electrical outlets.
- All covers are properly installed.

Starting Up Your System

Switch on the computer. The following should occur:

1. A blinking cursor appears on the screen
2. After a short time, an icon showing a computer screen appears in the upper right corner,



and the RAM memory test message appears in the upper left corner.

3. The computer starts the power-on self test (POST).
4. If the POST completes successfully, the amount of available memory is displayed, and a single beep occurs.
 - If the POST does not complete successfully, an error code is displayed. Also, either no beep or multiple beeps might occur. In this case, check the screen for the error message, and refer to Chapter 5, "Problem Solving" on page 5-1 to resolve the problem.
 - If the POST does complete successfully, proceed to the next step.

5. If this is the first time that your system has been powered up, or if its configuration has been changed, run the configuration utility as follows:
 - a. Power down the computer for several seconds and then power it up again.
 - b. When the icon appears in the upper right corner, press the F1 key to initiate the configuration utility. Then follow the instructions on the screen.
6. After running the configuration utility, install your operating system and then your application programs.

Installing an Operating System

You must have an operating system installed on your computer before you can use it for running any tasks. The 7585 Industrial Computer supports the following operating systems:

- Disk Operating System (DOS)
- Operating System/2* (OS/2*)

For information about installing and using your operating system, refer to the manuals that came with the operating system.

Installing Application Programs

For your computer to be able to perform the tasks that meet your needs, you must install application programs. For information about installing and using your application programs, refer to the manuals that came with the application programs.

Note: Before installing any application program, you must ensure that your system contains all of the storage requirements for that program.

Air Filters

The 7585 Industrial Computer contains three foam type air filters that must be cleaned or replaced periodically.

- To remove the door louvre air filter for cleaning or replacing, open the front access door and pull up the filter element. When reinstalling the filter element, be sure to push its entire length in all the way.
- To remove the front fan air filter for cleaning or replacing, open the front access door and slide the filter holder to the right. If you are going to replace the filter element, slide the old filter element out of the top of the holder and slide in a new element. When reinstalling the filter holder, be sure to engage it properly on both the top and bottom tracks before sliding it to the left.
- To remove the rear fan air filter for cleaning or replacing, remove the two screws that secure the filter cover around the fan, pull the cover out, and replace the filter element.

Security Features

Security involves protecting your computer components and preserving the data stored in your computer. There are several security features available to help protect your computer, the hardware inside, and the information stored on your hard disk.

Front Access Lock and Keys

To prevent unauthorized access to the diskette drive or other removable media, a special key-lock may be installed on the front access door of the system unit. **This special key-lock is available only from your IBM authorized dealer; it is not available directly from IBM.**

If your computer has the key-lock feature installed, you should record the key's serial number and manufacturer's address in Appendix A, "System Records" on page A-1 or in a secured place. If replacement or duplicate keys are needed, they must be ordered from the lock's manufacturer.

Diskette Write-Protect Jumper

The diskette write-protect jumper allows the diskette drives to read information from a diskette, but prevents the diskette drives from writing information to the diskettes. The default setting for this jumper allows both reading from and writing to the diskette drives. The jumper setting must be changed to provide the protection feature; refer to item **14** in Figure 1-3 on page 1-4.

Serial and Parallel Port I/O Control

This feature can disable input and output functions of the serial and parallel ports and their attached devices. The control of this feature is set by accessing the Configuration Utility program during the computer's Power-On Self Test (see "Power-On Self Test (POST)" on page 6-17).

Passwords

Password security is implemented by a power-on password, a System Administrator password, and a keyboard password. The Configuration Utility program gives directions for setting, changing, and disabling the passwords. Refer to "Power-On Self Test (POST)" on page 6-17 for gaining access to the Configuration Utility program.

If it should become necessary to remove either a power-on password or System Administrator password because it is forgotten or for servicing, follow the procedure given in "Removing a Power-on Password or System Administrator Password" on page 4-6.

Power-On Password

A power-on password denies access to the computer by an unauthorized user when the computer is powered on. When a power-on password is active, the password prompt appears on the screen each time the computer is powered on. The computer starts only after the correct password is entered.

System Administrator Password

The System Administrator password restricts access to the Configuration Utility, which controls the security features. Once the Administrator Password is set, the password prompt appears each time an attempt is made to access the Configuration Utility program.

Removing a Power-on Password or System Administrator Password

If it should become necessary to remove either a power-on password or System Administrator password because it is forgotten or for servicing, do the following:

1. Power-off the computer.
2. Remove the memory retention (lithium) battery for 15 minutes. (For instructions on removing the battery, refer to "Memory Retention Battery" on page 7-9.) This erases the password from memory.
3. Reinstall the battery.
4. Power-on the computer.

Note: After removal of the memory retention battery, the Configuration Utility program automatically resets all configuration settings to the default (factory) setting. Thus, the Configuration Utility must be run the next time the system is turned on after the battery is removed.

Keyboard Password

A keyboard password allows locking the keyboard while the computer is turned on. Setting the keyboard password depends on the operating system. The OS/2 operating system provides keyboard-password protection as a standard feature; other operating systems might or might not offer this feature. Refer to your operating system documentation for more information.

Startup Sequence Control

The computer has a default startup sequence that checks diskette drives first, then any available hard drive, then any other startup device that may be installed. You can change the startup sequence by arranging the startup devices in any order that meets your needs. For example, you can make your hard drive your primary startup device, thereby preventing a person from starting the computer from a diskette drive.

You can *customize* the startup sequence by changing the order in which the computer checks the devices by accessing the Configuration Utility program (see "Power-On Self Test (POST)" on page 6-17).

Unattended Start Mode

After setting a power-on password, you can set the computer to operate in the *unattended start mode*. This mode locks the keyboard and mouse, but allows the computer to start the operating system and carry out the instructions in the CONFIG.SYS and AUTOEXEC.BAT files. Although the password prompt does not appear, the keyboard and mouse remain locked until the correct password is entered. This mode is ideal for network servers and other computers that operate unattended. If a power failure occurs, the computer automatically restarts when power returns and resumes normal operation, without operator intervention.

The unattended start mode is enabled or disabled by using the Configuration Utility Program (see "Power-On Self Test (POST)" on page 6-17).

Keyboardless Operation Mode

The configuration Utility Program allows an option for starting the system without a keyboard attached.

Power Management Program

Power management is a standard feature that reduces the power consumption of your computer when it is not in use. Power management automatically initiates reduced power modes for the processor and hard disk after a specified period of inactivity. The Configuration Utility program has a default setting of 30 minutes for automatically initiating power management. This time can be changed by accessing the Configuration Utility program (see "Power-On Self Test (POST)" on page 6-17).

Chapter 5. Problem Solving

This chapter contains information that could help you solve some problems that might arise with your computer. The chapter is organized as follows:

- “Diagnostic Tools” describes the diagnostic tools available to you for solving computer problems.
- “Testing the Computer” describes what to check before testing the computer, and how to start and run the test programs.
- “Troubleshooting Charts” helps you quickly find solutions for most computer problems.
- “Error Messages” lists messages you might see on your screen when you either have a hardware problem or change the computer setup.

If you are unable to resolve a problem using this information, you should call for the assistance of a trained service technician.

Diagnostic Tools

The following tools are available to diagnose hardware-related problems:


- Power-on self-test (POST)
- Configuration Utility program
- PS/ValuePoint Diagnostics Type 5 diskette
- Troubleshooting charts
- Error messages

Descriptions of each of these tools follow.

Power-On Self-Test (POST)

Each time you turn on the computer, it performs a series of tests that check the operation of the base computer. This series of tests is called the *power-on self-test* or *POST*. This test:

- Checks basic system-board operations
- Checks the memory operation
- Compares the current system configuration with that established by the Configuration Utility program
- Starts the video operation
- Verifies that the diskette drive is working
- Verifies that the hard disk drive is working

While the memory is tested, numbers indicating the amount of available base and extended memory appear in the top-left corner of your screen, and the Configuration Utility program symbol  appears in the top-right corner of your screen.

Note: The amount of available memory shown might be less than expected because of basic input/output (BIOS) shadowing in random access memory (RAM).


- If POST finishes without detecting any problems, you hear one beep. The first screen of your operating system or application program appears.
- If POST detects a problem, you will hear more than one beep or no beep, and an error code or number will appear for a few seconds in the top-left corner of your screen. Next, an error panel appears, and the error message number and explanation are shown. You can press **Enter** to run the Configuration Utility program or press **Esc** to continue starting the operating system.

A single problem might cause several error messages to appear. When you correct the cause of the first error message, the other error messages probably will not appear on the screen the next time you turn on the computer.

The Configuration Utility Program

The Configuration Utility program lets you view and change important information about your computer's hardware. Also, it displays text messages describing POST errors.

You can access the Configuration Utility program by:

- Pressing **F1** when the Configuration Utility program symbol  is in the top-right corner of the screen during memory count.
- Pressing **Enter** from a POST error panel.

If your Configuration Utility program normally displays in your native language, but then displays in English or a language other than your own, call for service.

The Diagnostic Programs

Your 7585 Industrial Computer came with a PS/ValuePoint Diagnostics Type 5 diskette, which contains the hardware diagnostic programs. Use this diskette when you suspect a hardware failure. This program requires minimal interaction from you. You can use it to test the base computer, as well as the keyboard and some external devices.

Troubleshooting Charts

The troubleshooting charts list symptoms of problems (such as "The mouse is not working."), as well as steps to correct the problem.

Error Messages

Error messages that appear on the screen might be text, numeric, or both. There are three types of error messages:

- **POST error messages**
Messages that appear if POST finds a problem.
- **Diagnostic error messages**
Messages that appear if a problem is detected by the test program.
- **Software-generated error messages**

Messages that appear if a problem or conflict is detected by the application program, the operating system, or both. For an explanation of these messages, refer to the information that came with the software package.

Testing the Computer

The test programs are designed to test *IBM* products only. Non-IBM products might present misleading error messages or unexpected computer responses. If you want to test a non-IBM product, refer to the information that came with the product.

If the computer does not start when you press the power switch, do the following:

- Make sure all cables are securely connected to the correct locations.
- Check to see if the voltage-selection switch is set to the correct position.


Starting the Computer

You will be listening for a beep during this procedure.

Note: For the following procedure, if the Enter password message appears on the screen, a power-on password is set. Type the correct password; then press **Enter** to continue.

1. Turn on all external devices, and turn on the computer. Watch the screen, and listen for a beep. Numbers indicating the amount of base memory and extended memory appear in the top-left corner of the screen. The computer is running POST.

Note: The amount of available memory shown might be less than expected because of BIOS shadowing in RAM.

The Configuration Utility program symbol  appears in the top-right corner of the screen.

- If POST finishes without detecting an error, you hear one beep and the first screen of your operating system or application program appears.
 - If POST detects an error, you hear multiple beeps or no beep, and an error code and a description of the error appear. Press **Enter** to access the Configuration Utility program.
 - If there is no beep, have the computer serviced.
2. Find your computer response in the following table; then go to the section specified.

Computer Response	Go to:
Application program or operating system appears.	"Starting the Diskette-Based Diagnostic Program" on page 5-5.
Blank screen, unreadable screen, or other response.	"Troubleshooting Charts" on page 5-6.
POST error code or message appears.	"Error Messages" on page 5-13.

Starting the Diskette-Based Diagnostic Program

The diagnostic programs found on the PS/ValuePoint Diagnostics Type 5 diskette can be used to test the computer and many of its components. Do the following to start the diagnostic programs:

1. Turn off the computer.
2. Insert the PS/ValuePoint Diagnostics Type 5 diskette into the primary diskette drive.

Note: If the computer does not have a diskette drive, have the network administrator make the diskette image available to the computer. After the diskette image is made available, continue with the next step.

3. Turn on the computer.
4. When the Main Menu appears, follow the instructions on the screen to make your selections.

Notes:

1. If the Main Menu screen does not appear and you do not get an error message, have the computer serviced.
2. If the computer stops after you start the diagnostic program and you cannot continue, have the computer serviced.

If testing does not find a problem, but you still have one, go to "Troubleshooting Charts" on page 5-6, and look for the problem symptom.

Troubleshooting Charts

If you have just added new software or a new computer option and your computer is not working, do the following before using the Troubleshooting chart.

- Remove the software or device you just added
- Run the diagnostic programs to determine if the computer is running correctly.
- Reinstall the new software or new device

You can use the troubleshooting charts in this chapter to find solutions to problems that have definite symptoms. Look for your symptom in the left column of the chart. Instructions and probable solutions to your problem are in the right column of the chart.

Note: These charts are alphabetically arranged. To locate the Power-on Problems chart, look immediately after the Option Problems chart.

Diskette Drive Problems	Action
Diskette drive in-use light stays on or the computer bypasses the diskette drive.	<p>If there is a diskette in the drive, verify that:</p> <ol style="list-style-type: none"> 1. The diskette is good and not damaged. (Try another diskette you know to be good.) 2. The diskette is inserted correctly (label up and metal-shutter end first) in the drive. 3. The diskette contains the necessary files to start the computer. 4. Your software program is OK (see page 5-12). <p>If the diskette drive in-use light stays on, or the computer continues to bypass the diskette drive, have the system unit serviced.</p>

Display Self-Tests	Action
Some displays have their own self-tests.	<p>If you suspect a problem with your display:</p> <ol style="list-style-type: none"> 1. Turn off the display and system unit. 2. Disconnect the display signal cable from the system unit. 3. Set the Brightness and Contrast controls to the center position. 4. Turn on the display. 5. Is the screen white in the center with some shading near the edges, and does it have a black strip on either one side, both sides, top, or bottom? <p>Yes The display has successfully passed the self-test. Refer to the instructions supplied with your display for additional testing information. If you still have a problem with the display, and you have not already done so, check "Display Problems" below.</p> <p>If you still cannot find the problem, have the display and system unit serviced.</p> <p>No Refer to the instructions supplied with your display for further testing information.</p>

Display Problems	Action
<p>Wavy, unreadable, rolling, or distorted screen, or screen jitter.</p>	<p>Do the following:</p> <ol style="list-style-type: none"> 1. If the display self-tests show the display is OK, consider the location of the display. Magnetic fields around transformers, appliances, fluorescent lights, or other displays can cause screen jitter, or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the display and move the device and the display at least 305 mm (12 in.) apart. (Moving a color display while it is turned on might cause screen discoloration.) Turn the display on. <p>Note: The distance between displays and diskette drives should be at least 76 mm (3 in.) to prevent diskette drive read/write errors.</p> <ol style="list-style-type: none"> 2. Verify that the refresh rate is set correctly. Change it if necessary. <p>If the problem remains, have the display and system unit serviced.</p>
<p>The display works when you turn on the computer but goes blank when you start some application programs.</p>	<p>Do the following:</p> <ol style="list-style-type: none"> 1. Check that the primary display cable is connected to the video connector. 2. Check that the software program is OK. 3. Run the diagnostic tests to isolate the cause of the problem.
<p>Blank screen and no beep.</p> <p>Note: If you are not sure if you heard a beep, turn the computer off, then on again, and listen for the beep.</p>	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The computer power cable is plugged into a working electrical outlet and into the computer. 2. The cables connected to the system unit are secure. 3. The computer and display power switches are on. 4. The voltage-selection switch is set to the correct position. 5. A math coprocessor, processor upgrade, or other option that was just installed is installed correctly. <p>If the items above are correct and the screen remains blank, have the system unit serviced.</p>
<p>Blank screen and 1 beep.</p>	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The display power cable is connected to the display and to a working electrical outlet. 2. The display is turned on and the Brightness and Contrast controls are adjusted correctly. 3. The display signal cable is connected to the correct connector on the computer. <p>If the screen remains blank, run the display self-tests (see page 5-6). If those tests show the display is OK, have the system unit serviced.</p>
<p>Blank screen, continuous beep, or more than 1 beep.</p>	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The voltage selection switch is properly set for the electrical power used in your country. <p>If the voltage selection switch is in the correct position and the system continues to show no response, have the system unit serviced.</p>

Display Problems	Action
Blank screen and 3 short beeps.	POST could not find usable 640KB of memory required to start the system. Have the system unit serviced.
Only the cursor “_” appears.	Have the system unit serviced.
Wrong characters appear on the screen.	Have the system unit serviced.

General Problems	Action
Problems such as broken cover locks or indicator lights not working.	Have the system unit serviced.

Intermittent Problems	Action
A problem occurs only occasionally and is difficult to detect.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. All cables and cords are securely connected to the rear of the computer and attached options. 2. When the computer is turned on, air is flowing from the rear of the computer at the power supply fan grill. If there is no air flow, the power supply fan is not working. This causes the computer to overheat and shut down. <p>Run the diagnostic tests in loop mode to verify that the computer components are working correctly.</p> <p>If the items above are correct and the test programs found no problem, the next time the problem occurs, make a note of what the problem is and what the computer is doing when the problem occurs. Then contact your place of purchase or service technician for help.</p>

Keyboard, Mouse, or Pointing-Device Problems	Action
All or some keys on the keyboard do not work.	<p>Verify that the keyboard cable is securely connected to the correct port on the computer.</p> <p>You might have a password or the unattended start mode set. To use the computer, type the correct password and press Enter.</p> <p>If the password is not working correctly, have the system unit serviced.</p> <p>If you forget your power-on password, you can erase it by removing the battery for 15 minutes, reinstalling it, configuring the computer, and setting a new power-on password.</p> <p>Run the diagnostic tests to verify that the computer components are working correctly.</p> <p>If the test programs do not find the problem, have the keyboard, keyboard cable, and system unit serviced.</p>
The mouse or pointing-device does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The mouse or pointing-device roller ball is clean. 2. The mouse or pointing-device cable is securely connected. 3. The device drivers are in the correct path and are installed correctly. 4. The mouse drivers are loaded. 5. The mouse cable is securely connected to the correct port on the computer. 6. The unattended start mode is not set. The unattended start mode disables the pointing-device port when the computer is turned on, and the device driver will not be loaded. <p>Note: The pointing-device port is also known as the auxiliary-device port or mouse port.</p>

Option Problems	Action
An option that was just installed does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The option is designed for the computer. 2. You followed the installation instructions supplied with the option. 3. The option is installed correctly. 4. You have not loosened any other installed options or cables. 5. There are no interrupt or address conflicts. Check any switches on all the installed options to ensure that their interrupts and addresses are not the same. <p>Run the IRQ/DMA test located on the PS/ValuePoint Diagnostics Type 5 diskette. If the test programs find no problem, have the system unit or the option serviced.</p>

Option Problems	Action
An option that used to work does not work now.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. All the option hardware and cable connections are secure. Reseat the option if you are not sure. 2. There are no interrupt or address conflicts. Check any switches on all the installed options to ensure that their interrupts and addresses are not the same. <p>If the option came with its own test instructions, use those instructions to test the option.</p> <p>If the items above are correct and the test programs found no problem, have the system unit and option serviced.</p>

Power-on Problems	Action
No beep, power-on indicator does not come on, and power supply fan does not run.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The power cables are plugged into properly grounded, operational, electrical outlets and are connected correctly to the computer components. 2. The voltage-selection switch is set to the correct position. <p>If the items above are correct, have the system unit serviced.</p>
No beep during POST	<p>Verify that:</p> <ol style="list-style-type: none"> 1. All the option hardware and cable connections are secure. Reseat the options if you are not sure. 2. The voltage-selection switch is set to the correct position. <p>If the items above are correct, have the system unit and option serviced.</p>
No beep, power supply fan runs, power-on indicator is on, and system stops during POST with a message displayed.	<p>Go to "POST Messages" on page 5-13.</p> <p>If the error message displayed is not listed, have your system unit serviced.</p>
No beep and the system is otherwise functional.	Have the system unit serviced.

Printer Problems	Action
The printer does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The printer is turned on and is online. 2. The printer signal cable is connected to the correct parallel or serial connector on the computer. <p>Note: Non-IBM printer cables may cause unpredictable problems.</p> <ol style="list-style-type: none"> 3. The printer is working correctly by running the tests described in the printer manual. 4. You have assigned the printer port correctly in your operating system or application program. <p>Run the Printer Test and port diagnostic test included with the system diagnostic programs. If the port diagnostic tests show the computer is OK, replace the printer cable.</p>

Screen Messages	Action
An I9990301 message	<p>A hard disk drive problem occurred. Do the following:</p> <ol style="list-style-type: none"> 1. Verify that cables connected to the hard disk drive are secure. 2. If you just installed a secondary hard disk drive, verify that the drive jumpers are set correctly. 3. Run the diagnostic tests to verify that the hard disk drive is working correctly. 4. If the hard disk drive is not working correctly, have the computer serviced.
An I9990305 message	<p>An operating system could not be found.</p> <p>Run the diagnostic tests to verify that the hard disk drive is working correctly. If there is a problem with the hard disk drive (such as a bad sector), you might have to reinstall the operating system.</p>
Password prompt	<p>A power-on or administrator password is set. To use the computer, type the correct password and press Enter.</p> <p>If the password is not working correctly, have the system unit serviced.</p> <p>If you forget your power-on password, you can erase it by removing the battery for 15 minutes, reinstalling it, configuring the system, and setting a new power-on password.</p>
Error prompt —or— Any other information or message.	<p>Do the following:</p> <ol style="list-style-type: none"> 1. Turn off the computer. 2. Insert the PS/ValuePoint Diagnostics Type 5 diskette in the primary diskette drive. 3. Turn on the computer. 4. If the error appears again, have the system unit serviced. 5. If the error does not appear again, follow the screen messages. When the Main Menu appears, follow the instructions on the screen to make your selections. <p>If the Main Menu does not appear, have the system unit serviced.</p>

Software Problems	Action
Is your software program OK?	<p>To determine if problems are caused by the software, verify that:</p> <ol style="list-style-type: none"> 1. Your computer has the minimum memory requirements needed to use the software. Refer to the information supplied with the software to verify memory requirements. 2. The software is designed to operate on your computer. 3. Other software works on your computer. 4. The software you are using works on another computer. <p>If you received any error messages when using the software program, refer to the information supplied with the software for a description of the messages and solutions to the problem.</p> <p>If the items above have been verified and the problem remains, contact your place of purchase or service technician for help.</p>

Note: If you cannot find your problem in the troubleshooting charts, go to "Starting the Computer" on page 5-4 to test the computer. If you have already run the test program, or if running the test does not find the problem, have the computer serviced.

Error Messages

Error messages indicate that a problem exists in your hardware or software. Troubleshooting and servicing of complex problems resulting in these error messages should be performed by a trained service technician.

Computer problems can result in two types of error messages — POST and diagnostic:

- POST error messages appear when POST finds problems with the hardware during startup or when a change in the hardware configuration is found. POST error messages are 3-, 4-, 5-, 8-, or 12-character alphanumeric messages and include brief text messages (except I999XXXX errors).
- Diagnostic error messages appear when the Diagnostic program detects a problem with a hardware option. The messages present text information that can be used to identify a failing part.

Note: Error messages for operating-system and software problems are generally text messages, but they also can be numeric messages. For information about these error messages, refer to the information that came with the operating system or application program, or both.

POST Messages

The computer might display more than one error message. Often, the first error to occur causes subsequent errors. Always follow the suggested action for the *first* error message that appears.

In the following table, “X” can be any alphanumeric character.

POST Message	Description
101 102 103 104 105 106 107 108 109	A failure occurred during testing of the system board and micro-processor. Action: Have the system unit serviced.
110	A memory parity failure occurred during testing of the system board. Action: Run the diagnostic tests to verify that a problem exists in the memory-module kits. Refer to the system memory table to see if you can reconfigure (swap) your system memory to aid in identifying the defective memory module. If you cannot identify the defective memory module in this way, have the system unit serviced.
111 112 113	An input/output (I/O) channel check occurred during testing of the system board and memory. This failure is generally caused by an adapter. Action: Have the system unit serviced.

POST Message	Description
114	<p>An adapter read-only memory (ROM) error occurred.</p> <p>Action: Remove the options. If you can boot the system without the option installed, reinstall each option and retest. When an option fails, replace it.</p> <p>If the problem cannot be isolated and corrected, have the system unit serviced.</p>
115	<p>A direct memory access (DMA) error occurred.</p> <p>Action: Have the system unit serviced.</p>
116	<p>A system-board port read/write error occurred.</p> <p>Action: Have the system unit serviced.</p>
120	<p>A microprocessor error occurred.</p> <p>Action: Have the system unit serviced.</p>
151	<p>A failure occurred during the testing of the real time clock.</p> <p>Action: Run the diagnostic programs to get more information.</p>
161	<p>The battery is dead.</p> <p>CAUTION: Danger of explosion if battery is incorrectly replaced.</p> <p>Replace the battery with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.</p> <p>Action: Until you replace the battery, the computer can be used. However, you will have to run the Configuration Utility program and set the time and date each time the computer is turned on.</p>
162	<p>A change in device configuration occurred. This error occurs under one or more of the following conditions:</p> <ul style="list-style-type: none"> • A new device has been installed. • A device has been moved to a different location or cable connection. • A device has been removed or disconnected from a cable. • A device is failing and is no longer recognized by the computer as being installed. • An external device is not turned on. • An invalid checksum is detected in the battery-backed memory. <p>Action: Verify that all external devices are turned on. External devices must be turned on before the computer is turned on.</p> <p>If you did not add, remove, or change the location of a device, a device is probably failing. Running the diagnostic programs might isolate the failing device, but you must have the system unit serviced.</p>
163	<p>The clock is not working correctly.</p> <p>Action: Set the correct date and time. If the date and time are set correctly and saved and the 163 error message reappears, replace the battery.</p> <p>If this does not correct the problem, have the system unit serviced.</p> <p>Until the system unit is serviced, the computer can be used, but any application programs that use the date and time will be affected.</p>

POST Message	Description
164	<p>A change in the memory configuration occurred. This error can be caused by adding memory, removing memory, or incorrectly installing memory.</p> <p>Note: The computer can be used with decreased memory capacity.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If you have newly installed memory, verify that the new memory is correct for your computer and that the memory module configuration matches one of the configurations shown in the system memory table. 2. Running the diagnostic tests might isolate the location of the problem memory-module kit and provide additional information. 3. If the system diagnostic tests fail, have the system unit serviced.
20X	<p>A failure occurred during testing of the memory. This error can be caused by incorrectly installed memory, a failing memory-module kit, or a system-board failure.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If you just installed memory, verify that the new memory is correct for your system unit, that it is installed correctly, and that the memory module configuration matches one of the configurations shown in the system memory table. 2. Run the diagnostic tests to verify the problem. <p>If the system diagnostic tests fail, have the system unit serviced.</p>
301 302 303 304 305	<p>A failure occurred during testing of the keyboard and keyboard controller. These error messages also might be accompanied by continuous beeping.</p> <p>Action: Ensure that:</p> <ol style="list-style-type: none"> 1. Nothing is resting on the keyboard and pressing a key 2. No key is stuck 3. The keyboard cable is connected correctly to the keyboard and to the correct connector on the computer. <p>Running the diagnostic tests can isolate the computer component that failed, but you must have your system unit serviced.</p> <p>Note: If you have just connected a new mouse or other pointing device, turn the computer off and disconnect that device. Wait at least 5 seconds, and then turn the computer on. If the error message goes away, replace the device.</p> <p>If the error message remains, have the keyboard and cable or the system unit serviced.</p>
601	<p>A failure occurred during testing of the diskette drive and diskette-drive controller. This error can be caused by a loose or incorrectly connected cable, a failing drive, or a failing system board.</p> <p>Action: The computer can be used, but one or more diskette drives might not work. Running the diagnostic tests can isolate the diskette drive that failed, but you must have your system unit serviced.</p>
602	<p>The computer is not able to start the diskette in the drive. The diskette might be damaged or formatted incorrectly.</p> <p>Action: Try another startable diskette that is in working condition.</p>

POST Message	Description
604	<p>A failure occurred during the testing of a diskette drive.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Verify that the Configuration Utility program correctly reflects the type of diskette drive you have installed. 2. Run the system diagnostic programs. 3. If the system diagnostic programs fail, replace the diskette drive.
11XX	<p>A failure occurred during testing of the system-board serial port.</p> <p>Action: If you have a modem, serial printer, or other serial device attached to your computer, verify that the serial cable is connected correctly. If it is, use the following procedure:</p> <ol style="list-style-type: none"> 1. Turn off the computer. 2. Disconnect the serial cable from the serial port. 3. Turn on the computer. <p>If the POST error message does not reappear, either the serial cable or the device is probably failing. (See the documentation that came with the serial device for additional testing information.)</p> <p>If the POST error message reappears, have the IDE device or system unit serviced.</p>
178X	<p>A failure occurred during testing of the hard disk drive or a primary or secondary IDE device.</p> <p>Action: Run the system diagnostic tests.</p>
2401	<p>A failure occurred during testing of the video controller. This error can be caused by a failing display, a failing system board, or a failing video adapter.</p> <p>Action: Verify that the display is connected correctly to the video port. If so, have the system unit serviced.</p>

POST Message	Description
8601 8602 8603	<p>A failure occurred during testing of the pointing device (mouse) and pointing device controller.</p> <p>Note: An 8603 error can be caused by the addition or removal of a mouse.</p> <p>This error can be caused by the pointing device or by a failing system board.</p> <p>Note: This error also can occur if electrical power was lost for a very brief period and then restored. In this case, turn off the computer for at least 5 seconds, and then turn it back on.</p> <p>Action: Ensure the keyboard and pointing device are attached to the correct connectors. If they are connected correctly, use the following procedure:</p> <ol style="list-style-type: none"> 1. Turn off the computer. 2. Disconnect the pointing device from the computer. 3. Turn on the computer. <p>If the POST error message does not reappear, the pointing device is probably failing. (See the documentation that came with the pointing device for additional testing information.) If the problem remains, have the pointing device serviced.</p> <p>If the POST error message reappears, run the diagnostic tests to isolate the failure. If the diagnostic tests do not find a problem and the POST error message remains, have the system unit serviced.</p>
I9990301	<p>A hard-disk failure occurred.</p> <p>Action: Have the system unit serviced.</p>
I9990305	<p>An operating system could not be found.</p> <p>Action: Run diagnostic tests to verify that the hard disk is functioning correctly. If there is a problem with the hard disk (such as a bad sector), you might have to reinstall the operating system.</p> <p>If you cannot reinstall the operating system, have the system unit serviced.</p>
Other Numbers	<p>The computer POST found an error.</p> <p>Action: Follow the instructions on the screen.</p>

Diagnostic Messages

Diagnostic error messages appear when the PS/ValuePoint Diagnostics Type 5 diskette program detects a problem with the system. The messages present text information that can be used to identify a failing part.

Although parts of your system may be failing, you might be able to continue to use your computer. However, you will need to have your system unit or option serviced.

Part 2. Hardware Maintenance Information

Part 2 contains service-oriented information which assists in recognizing and replacing field-replaceable units (FRUs) that have failed or are questionable.

Chapter 6. Service Diagnostic Information	6-1
Before Replacing a System Board	6-2
FRU Isolation for 486DX4 System Boards	6-2
General Checkout	6-3
Undetermined Problem	6-6
Display	6-7
Installed Devices List	6-8
Single In-Line Memory Modules (SIMMs)	6-9
Memory Test	6-10
Symptom-to-FRU Index	6-11
Beep Code Index	6-12
Symptom/Error Index	6-12
Diagnostics and Test Information	6-17
Power-On Self Test (POST)	6-17
Diagnostics Diskette	6-17
To load the diagnostics diskette:	6-18
Diagnostic Menus	6-18
Diagnostic Diskette Main Menu	6-18
System Checkout	6-19
Diagnostic Test Select Menu	6-19
Diskette Test Select Menu	6-20
Hard Disk Drive Test Select Menu	6-20
Formatting a Hard Disk Drive	6-21
Formatting Procedure	6-21
Video Test Select Menu	6-22
Error Log	6-23
Creating the Error Log	6-23
Starting the Test	6-23
Displaying the Error Log	6-23
Keyboard	6-24
Printer	6-25
Power Supply	6-25
Chapter 7. Removal and Replacement Procedures	7-1
Switching Off Power and Disconnecting Cables	7-6
Removing the System Unit from its Mounting	7-7
Removing the System Unit from a Rack	7-7
Opening the System Unit	7-7
Feature Cards	7-8
Memory Retention Battery	7-9
RAM Memory Modules (SIMMs)	7-10
Cache Memory Modules	7-11
Video Memory Module	7-12
Microprocessor	7-13
Riser Card	7-14
System Board	7-15
Diskette Drive	7-17

Hard Disk Drive	7-18
CD ROM Drive	7-19
Power Supply	7-20
Front Fan	7-21
Rear Fan	7-22
LED Assembly	7-23
Power Switch	7-24
Speaker	7-25
Chapter 8. Parts Catalog	8-1
IBM Service Parts Warranty	8-1
Covers	8-2
Chassis	8-3
Fans, Power Supply, and Speaker	8-4
Air Filters, LEDs, and On/Off Switch	8-5
Diskette Drive and Mounting	8-6
Hard Disk Drive and Mounting	8-7
CD-ROM Drive and Mounting	8-8
System Board Components	8-9
Rackmount Plates and Handles	8-10
Keyboards	8-11
Power Cords	8-12

Chapter 6. Service Diagnostic Information

This chapter contains general and memory checkout procedures, a diagnostic test procedure, a Symptom-to-FRU Index, and other procedures for isolating problems. If your system is malfunctioning, start with "General Checkout" on page 6-3.

The diagnostics program is intended to test only the basic standard computer system and supported hardware features. Other products, prototype cards, or modified options can give false errors and invalid computer responses.

Before Replacing a System Board

The processor is not included with the system board FRU; it is a separate FRU.

If you are instructed to replace the system board, you should do the following:

- Install the processor from the old system board onto the new system board.
- If any options (RAM modules, cache, or video memory) are on the old system board, install them onto the new system board.
- Ensure that all the new system board jumper settings are the same as the old system board jumper settings.

If the new system board does not correct the problem, reinstall the options back onto the old system board, reinstall the old system board, and replace the processor with a new one.

FRU Isolation for 486DX4 System Boards

The 486DX4 processor FRU consists of the processor inserted into a voltage regulator card, with a heat sink bonded to the processor's top. Do not attempt to separate these parts.

If you are instructed to replace the system board, first check for 3.5 Vdc between the probe points indicated on the voltage regulator board in Figure 6-1.

- If the voltage is correct (approximately 3.5 volts), replace the system board.
- If the voltage is not correct, replace the processor FRU.

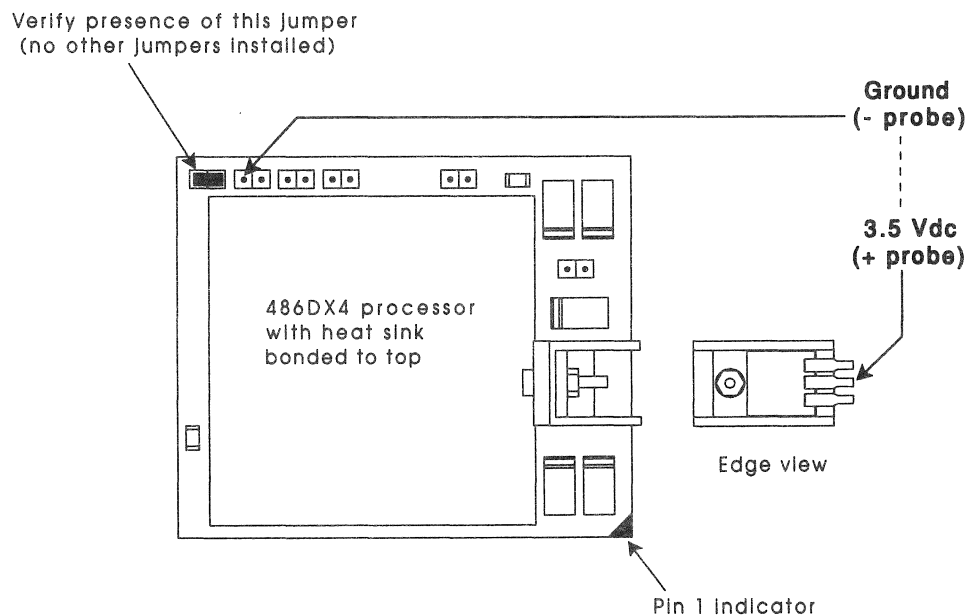


Figure 6-1. Voltage regulator probe points on 486DX4 FRU

General Checkout

001

- Power-off the computer and all external devices.
- Check all cables and power cords.
- Make sure there are no diskettes in the drives.
- Power-on all external devices.
- Power-on the computer.

Note: You can press **Esc** to speed through the memory count when the system is first powered on.

- Watch the screen for a POST error message.

DID YOU RECEIVE A POST ERROR MESSAGE?

Yes No

002

Go to Step 008 on page 6-4.

003

IS THE ERROR 162?

Yes No

004

If you remove or install memory, a 164 error is displayed. Follow the instructions on the screen. Otherwise, go to "Symptom-to-FRU Index" on page 6-11. If that does not solve the problem, go to Step 008 on page 6-4.

005

HAS THE CONFIGURATION BEEN INTENTIONALLY CHANGED?

Yes No

006

Go to Step 008 on page 6-4.

007

Press **Enter** to run the Configuration Utility program and verify that the error is no longer present. If you return to this point again, go to Step 008 on page 6-4.

(continued)

008

- Insert your PS/ValuePoint Diagnostics Type 5 diskette.
- Press **Ctrl+Alt+Del**.

DID THE COMPUTER BOOT FROM THE DIAGNOSTIC DISKETTE AND DID THE IBM HARDWARE DIAGNOSTIC LOGO SCREEN APPEAR?

Yes No

009

Go to "Symptom-to-FRU Index" on page 6-11.

010

- Select Test the System.
 - Press **Enter**.
 - If you need to create a formatted test diskette for this test, press **Y**, press **Enter**, then follow the instructions on the screen.
- Otherwise, press **N**, press **Enter**, then go to Step 011 on page 6-5.
-

011

IS THE INSTALLED DEVICES LIST CORRECT?

Yes No

012

Press **N**, then press **Enter**. Go to "Installed Devices List" on page 6-8. If that does not resolve the problem, continue with Step 016.

013

– Press **Y**, then press **Enter**

DID THE "SYSTEM CHECKOUT" MENU APPEAR?

Yes No

014

Go to "Symptom-to-FRU Index" on page 6-11.

015

– Run the diagnostics tests.

- If the test stops and you cannot continue, replace the last device tested.
- If the computer has incorrect keyboard responses, go to "Keyboard" on page 6-24.
- If the printer has incorrect responses, go to "Printer" on page 6-25.
- If the display has problems such as jittering, rolling, shifting, or being out-of-focus, go to "Display" on page 6-7.

DID THE TESTS IDENTIFY A FAILURE?

Note: If the test stops and you cannot continue, replace the last device tested.

Yes No

016

Check the "Symptom-to-FRU Index" on page 6-11 for any POST error or other error symptom you might have. If your error symptom is not listed, go to "Undetermined Problem" on page 6-6. If you cannot find a problem, it might be intermittent:

- Check for damaged cables and connectors.
- Reseat all adapters, drives, and modules.
- Check the system unit fans for proper operation.
- Start an error log and run the tests multiple times (see "Error Log" on page 6-23).

017

Follow the instructions on the display. If that does not correct the problem, go to "Symptom-to-FRU Index" on page 6-11.

Undetermined Problem

If an undetermined problem exists, check the power supply voltages (see "Power Supply" on page 6-25). If the voltages are correct, return here and continue with the following steps:

1. Power-off the computer.
2. Remove or disconnect the first (or next) of the following:
 - a. Non-IBM devices
 - b. External devices (modem, printer, or mouse)
 - c. Any adapters
 - d. Riser card
 - e. Memory modules
 - f. Extended video memory
 - g. External Cache
 - h. External Cache tag RAM
 - i. Hard drive
 - j. Diskette drive
3. Power-on the computer to re-test the system.
4. Repeat steps 1 through 3 until you find the failing device or adapter.

If all devices and adapters have been removed, and the problem continues, replace the system board (see "Before Replacing a System Board" on page 6-2). If the problem continues after replacing the system board, reinstall the old system board and replace the microprocessor (see "Microprocessor" on page 7-13).

Display

If the screen is rolling, blooming, distorted, or cannot be adjusted for brightness and contrast, replace the display assembly with a known good display assembly, if possible. If that does not correct the problem, replace the system board.

Note: During the first two or three seconds after the display is powered on, the following might occur while the display synchronizes with the computer.

- Unusual patterns or characters
- Static, crackling, or clicking sounds
- A “power-on hum” on larger displays

A noticeable odor might occur on new displays or displays recently removed from storage.

These sounds, display patterns, and odors are normal; do not replace any parts.

To verify the operation of the display, do the following to run the display self-test:

Note: This test does not work on all displays. If the test does not work, but you suspect the display, replace it. If that does not solve the problem, reinstall the original display, then replace the system board.

1. Power-off the computer and display.
2. Disconnect the display signal cable.
3. Power-on the display.
4. Turn the brightness and contrast controls to their maximum setting.
5. Check for the following conditions:
 - The screen should be white or light gray, with a black margin (test margin) on the screen.
 - You should be able to vary the screen intensity by adjusting the contrast and brightness controls.

Note: The location of the test margin varies with the type of display. The test margin might be on the top, bottom, or one or both sides.

If you do not see any test margin on the screen, or if you cannot adjust either the brightness or contrast with their respective controls, replace the display.

If you are unable to correct the problem, go to “Undetermined Problem” on page 6-6.

Installed Devices List

Follow the instructions on the screen for the installed devices list.

Warning: A customized setup configuration (other than default settings) might exist on the computer you are servicing. Running the Configuration Utility program might alter those settings. Note the current configuration settings and verify that the settings are in place when service is complete.

If the number of diskette drives shown in the installed devices list is not correct, do the following:

1. Restart the computer.
2. Run the Configuration Utility program to correct the drive information (see "Diagnostics and Test Information" on page 6-17.)
3. Run the diagnostic tests.
4. If you cannot correct the drive information, replace FRUs, in the following order, until the problem goes away:
 - Diskette drive
 - Diskette-drive cable
 - System board

If the number of hard disk drives shown in the installed devices list is not correct, do the following:

1. Check the hard disk drive jumper settings. All supported hard disk drives use jumpers or tabs to set drives as either primary or secondary. Refer to the jumper instructions that came with your hard disk drive(s).
2. Check the voltages to the hard disk drives (see "Power Supply" on page 6-25).
3. Restart the computer and check the configuration.
 - If the first drive is missing, replace the primary drive.
 - If any other drive is missing, replace that drive.
 - If all drives are missing, replace the primary drive.
 - If the problem remains, replace the drive cable.
 - If the problem still remains, replace the system board.

If any other adapter or device is missing from the installed devices list, run the Configuration Utility program (see "Diagnostics and Test Information" on page 6-17). Check to see if any adapter or device is set to a conflicting address with any other adapter or device. Also be sure that any adapter or device missing from the list is not set to "disabled."

Note: If the device is still missing from the list, run the diagnostics provided with that device.

Single In-Line Memory Modules (SIMMs)

Four 72-pin connectors are available on the system board to install single in-line memory modules (SIMMs). Memory modules supported are 4MB, 8MB, 16MB, and 32MB, with a maximum of 128MB. Memory module speed supported is 70 nanoseconds. A memory module must be installed in connector MEM1. Additional memory modules must be installed in connector MEM2, then in connector MEM3, then in connector MEM4. Refer to Table 3-1 on page 3-7 for the acceptable memory-module kit combinations. The combinations given in that table are the **only** combinations of memory-module kits that can be installed.

If a problem with memory modules is suspected, perform the following memory test procedure.

Memory Test

001

- Power-off the computer.
- Insert the PS/ValuePoint Diagnostics Type 5 diskette into drive A.
- Power-on the computer.
- Make a note of any POST errors you receive. Disregard 164 errors (memory size).

DID YOU RECEIVE A 2XX POST ERROR?

Yes No

002

DID THE COMPUTER BOOT FROM THE DIAGNOSTIC DISKETTE AND DID THE IBM HARDWARE DIAGNOSTIC LOGO SCREEN APPEAR?

Yes No

003

You might have to press **Esc** to continue.

- Select "Test the System." Run the memory tests. (Use the **RUN TESTS ONE TIME** option.)
- Continue with the question in Step 004.
- or –

If the computer did not boot from the diagnostic diskette with the IBM hardware diagnostic logo screen displayed, go to "Symptom-to-FRU Index" on page 6-11.

004

- Select "Test the System." Run the memory tests. (Use the **RUN TESTS ONE TIME** option.)

DID THE MEMORY TESTS FINISH WITHOUT AN ERROR?

Yes No

005

Follow the instructions on the display. If there are no instructions on the display, go to Step 007.

006

Your computer memory is now functioning correctly. If you suspect an intermittent problem, start an error log (see "Error Log" on page 6-23).

007

Press **Esc** to continue.

- Select "Test the System." Run the memory tests. (Use the **RUN TESTS ONE TIME** option.) If you cannot run the memory test or the test does not find a problem, replace the memory modules, one at a time, until the problem goes away. When the problem goes away, replace the last memory module removed. If that does not fix the problem, replace the system board.

Symptom-to-FRU Index

The Symptom-to-FRU Index lists error symptoms and possible causes. The most likely cause is listed first. Always begin with "General Checkout" on page 6-3. If you are unable to correct the problem using this index, go to "Undetermined Problem" on page 6-6.

Notes:

1. If you have both an error message and an incorrect audio response, diagnose the error message first.
2. If you cannot run the diagnostic tests, but did receive a POST error message, diagnose the POST error message.
3. If you did not receive any error message, look for a description of your error symptoms in the first part of this index.
4. Check all power supply voltages before you replace the system board. (See "Power Supply" on page 6-25.)
5. Check the hard disk drive jumper settings before you replace a hard disk drive. All supported hard disk drives use jumpers or tabs to set drives as either primary or secondary. Refer to the jumper instructions that came with your hard disk drive(s).

Important

1. Some errors are indicated with a series of beep codes. Refer to "Beep Code Index" on page 6-12 for an explanation of the beep codes.
2. For all system boards, the processor is a separate FRU from the system board; that is, the processor is not included with the system board FRU. Refer to "Before Replacing a System Board" on page 6-2 before replacing the system board.
3. The 486DX4 processor FRU consists of the processor and a voltage regulator. Refer to "FRU Isolation for 486DX4 System Boards" on page 6-2 before replacing the system board when the processor is a 486DX4.

Beep Code Index

In the following Beep Code Index, the numbers indicate the sequence and number of beeps. For example, a "2-3-2" error symptom (a burst of two beeps, three beeps, then a burst of two beeps) indicates a memory module problem. (Continue with the Symptom-to-FRU index below for other beep/no-beep symptoms.)

Beep Code	FRU/Action
1-3-1, 1-3-2	Memory Module System Board
1-4-4	Keyboard System Board
2-1-1, 2-1-2	Run Setup System Board
2-2-2	Video Card System Board
2-3-2	Memory Module System Board
2-4-3, 2-4-4	Run Setup Memory Module System Board
All other beep code sequences	System Board

Symptom/Error Index

In the following index, an "X" in an error message can represent any number.

Symptom/Error	FRU/Action
No power, or power supply fan not running	See "Power Supply" on page 6-25
One or both system cooling fans not running	See "Undetermined Problem" on page 6-6 Fan Cable(s) Fan Power Supply
No beep during POST but computer works correctly	Speaker
System Board	
No beep during POST	See "Undetermined Problem" on page 6-6 System Board Memory Module Any Adapter or Device Riser Card Power Cord Power Supply
One long and two short beeps during POST	System Board
Three short beeps during POST	See "Single In-Line Memory Modules (SIMMs)" on page 6-9 System Board
Continuous beep	System Board

Symptom/Error	FRU/Action
Repeating short beeps	Keyboard (stuck key?) Keyboard Cable System Board
Changing colors	Display
Intensity or color varies from left to right of characters and color bars	Display System Board
Flashing cursor with an otherwise blank display	System Board Primary Hard Disk Drive Hard Disk Drive Cable
Other display symptoms not listed above (including blank or illegible display)	See "Display" on page 6-7 System Board Display
Power-on indicator or hard disk drive in-use light not on, but computer works correctly	Power Supply System Board LED Cable
Customer indicator light(s) not working, but computer works correctly	Customer Cable or Device LED Board Power Supply (if used as power source) (Note: For easy check-out of LED board and power supply, swap the two LED cables.)
Diskette drive in-use light remains on or does not light when drive is active	Diskette Drive System Board Diskette Drive Cable
The "Insert a Diskette" icon appears with a known-good diagnostics diskette in the first 3.5-inch diskette drive	Diskette Drive System Board Diskette Drive Cable Network Adapter
Program loads from the hard disk with a known-good diagnostics diskette in the first 3.5-inch diskette drive	Check Configuration Utility Diskette Drive Diskette Drive Cable System Board Power Supply
A nonsystem disk or disk error-type message with a known-good diagnostic diskette	Diskette Drive System Board Diskette Drive Cable
Incorrect memory size during POST	See "Single In-Line Memory Modules (SIMMs)" on page 6-9 Memory Module System Board
Printer problems	See "Printer" on page 6-25 .
Serial or parallel port device failure (system board port)	External Device Self-Test OK? External Device Cable System Board
Serial or parallel port device failure (adapter port)	External Device Self-Test OK? External Device Cable Alternate Adapter System Board Riser Card

Symptom/Error	FRU/Action
Some or all keys on the keyboard do not work	Keyboard Keyboard Cable System Board
Clock Battery inaccurate	Clock Battery System Board
110	Follow screen instructions Memory Module System Board
161	Run Configuration Utility Clock Battery System Board
162 (and unable to run diagnostics)	Diskette Drive System Board Diskette Drive Cable
162	Run Configuration Utility Clock Battery System Board
163	Time and Date Set? Clock Battery System Board
164	Run Configuration Utility See "Single In-Line Memory Modules (SIMMs)" on page 6-9 System Board
199	See "Installed Devices List" on page 6-8
1XX (where X is not equal to digits above)	System Board
225	Unsupported Memory
2XX	See "Single In-Line Memory Modules (SIMMs)" on page 6-9 Memory Module System Board
303 (with an 8603 error)	Mouse Keyboard Keyboard Cable System Board
303 (with no 8603 error)	Keyboard Keyboard Cable System Board
305	System Board Keyboard Keyboard Cable Mouse
3XX (where X is not equal to digits above)	Keyboard Keyboard Cable System Board
604 (and unable to run diagnostics)	Diskette Drive A Diskette Drive Cable System Board

Symptom/Error	FRU/Action
604 (and able to run diagnostics)	Diskette Drive B Diskette Drive Cable System Board
662	Wrong diskette drive type
663	Wrong media type
6XX (where X is not equal to digits above)	Diskette Drive System Board External Drive Adapter Diskette Drive Cable Power Supply
7XX	Math Coprocessor System Board
9XX	System Board
1047	16-bit AT Fast SCSI Adapter
10XX (where X is not equal to digits above)	Alternate Parallel Adapter Riser Card
11XX	System Board
12XX	Alternate Serial Adapter Riser Card
13XX (A properly functioning joystick or paddle must be attached)	Game Control Adapter Riser Card
14XX	See "Printer" on page 6-25 .
15XX	SDLC Communications Adapter Riser Card
17X0 (1st Disk Drive) 17X1 (2nd Disk Drive) 17X2 (3rd Disk Drive) 17X3 (4th Disk Drive)	See "Power Supply" on page 6-25 System Board Hard Disk Cable Power Supply
209X	Diskette Drive Diskette Cable 16-bit AT Fast SCSI Adapter
20XX (where X is not equal to digits above)	BSC Adapter Riser Card
21XX	SCSI Device 16-bit AT Fast SCSI Adapter Alternate BSC Adapter Riser Card
2401, 2402	System Board Display
2409	Display
2410	System Board
30XX	PC Network Adapter LF Translator Cable Problem? Riser Card

Symptom/Error	FRU/Action
31XX	Alternate PC Network Adapter LF Translator Cable Problem? Riser Card
86XX	Mouse System Board
12902	Run Diagnostics System Board
12904	Run Diagnostics L2 Cache Adapter
I9990301 (Hard disk reset failure)	Possible hard disk drive problem
I9990305 (No startable device found)	Restart computer from diskette or check for valid startup sequence System Board
I999XXXX (where X is not equal to digits above) (There is an optional SCSI adapter installed)	SCSI Hard Disk Drive SCSI Adapter SCSI Cable

Diagnostics and Test Information

Power-On Self Test (POST)

Each time you power-on the computer, the power-on self test (POST) is initiated. The POST takes up to 90 seconds to complete, depending on the options installed.

The POST checks the following:

- System board
- Memory
- Video
- Hard disk drive(s)
- Diskette drive(s)
- Keyboard
- Mouse
- Parallel port
- Serial port(s)

To start the POST, power-on the display and the computer. The following happens:

1. The following icon



appears at the upper-right corner of the display. Pressing F1 at this time causes the Configuration Utility menu to appear after the POST has completed.

2. A count of the computer memory appears at the upper-left corner of the display.

Note: You can press **Esc** to speed through the memory count during POST.

3. If an error is detected, an error code appears under the computer memory count.

Note: Memory errors appear as 2XX in the upper-left corner of the display (X can be a number or letter).

4. Successful completion of POST is attained when there are no errors detected in the computer.
5. The computer attempts to load the operating system. If an operating system is not found, a graphic message (icon) is displayed requesting insertion a diskette into drive A and press the F1 key to resume operation.
6. If a critical error is encountered, the POST is halted.

Diagnostics Diskette

Use the PS/ValuePoint Diagnostics Type 5 diskette for testing the basic system hardware.

The diagnostics program is intended to test only the basic standard computer system and supported hardware. Other products, prototype cards, or modified options can give false errors and invalid computer responses.

To load the diagnostics diskette:

1. Power-off the computer.
2. Install the diagnostics diskette in Drive A.
3. Power-on the computer.
4. Do not press **F1** when the icon appears.
5. If any POST error(s) appear after POST, make a note of the error(s) and press the **Esc** key.
6. An IBM hardware diagnostics logo screen appears, followed by the Diagnostic Diskette Main Menu.
7. Select "Test the System."
8. If you want to test diskette drives, you will need a formatted test diskette for each diskette drive in your system. Press **Y** or **N**, then press **Enter**.

Note: Press **F1** for repair action and help whenever "F1=?" appears in the upper right corner of the screen.

Diagnostic Menus

The following menus are available in the advanced diagnostics tests.

Diagnostic Diskette Main Menu

This menu appears each time the diskette is loaded.

```
Diagnostic Diskette Main Menu

1 - Test the System
2 - Create Test Diskette
3 - Backup Hardware Diagnostic Diskette
4 - Display Error Log
5 - Access the Editor
6 - Display System Information

Press Esc to exit or
select a number and press Enter.
```

1 - Test the System: Starts the computer checkout procedure. Follow the instructions on the screen to run the tests.

2 - Create Test Diskette: Formats a scratch diskette for diagnostic use only.

3 - Backup Hardware Diagnostic Diskette: Copies the Diagnostic Diskette to another diskette.

4 - Display Error Log: Displays information in the error log.

5 - Access the Editor: Starts a text editor for DOS-based text files.

6 - Display System Information: Displays memory map, device drivers, hardware configuration, and the DOS environment.

System Checkout

This menu appears if the computer options are correctly set.

```
System Checkout

1 - Run tests ONE time
2 - Run tests MULTIPLE times
3 - Start Error Log
4 - End Error Log

Press Esc to exit or
select a number and press Enter.
```

1 - Run tests ONE time: Displays the Diagnostic Test select Menu. Follow the instructions on the menu to select the test(s) to run, then press **Enter** to run the tests. Follow the instructions on the screen to proceed through the tests.

2 - Run tests MULTIPLE times: Takes you to the Diagnostic Test select Menu. Follow the instructions on the menu to select the test(s) to run, then press **Enter** to run the tests. Enter the number of times to run tests or press **Enter** to run continuously. Follow the instructions on the screen to proceed through the tests.

3 - Start Error Log: Starts a log of errors found during testing.

4 - End Error Log: Stops logging entries into the error log.

Diagnostic Test Select Menu

This menu allows selecting the hardware components to test.

```
Diagnostic Test Select Menu

Instructions: - To select (*) or bypass ( ) a test,
              type the test number and press Enter.
              - To run selected (*) tests, press Enter.

(*) 1 Processor Unit
(*) 2 System Board
(*) 3 Keyboard
(*) 4 Pointing Device
(*) 5 X MB Memory
(*) 6 XXXX Kbytes External Cache Module
(*) 7 Super VGA Display
(*) 8 System Board Parallel Port
(*) 9 2 System Board Serial Port(s)
(*) 10 X Diskette Drive(s)
(*) 11 X Hard Disk(s)

98 Select (*) all tests.
99 Bypass ( ) all tests.

Selection:
```

Follow the instructions on the menu to select or bypass any test.

Note: The numbers for the options on the Diagnostic Test Select Menu can change depending on the options installed in the system you are servicing.

Diskette Test Select Menu

This menu allows testing the diskette drives and the control logic on the system board.

Diskette Test Select Menu

- 1 - Seek Test
- 2 - Write, Read, Compare Test
- 3 - Verify Diskette Test
- 4 - Speed Test
- 5 - Diskette Change Test

Press Esc to exit or
select a number and press Enter.

1 - Seek Test: Tests the basic diskette seek operations, including sequential and random diskette drive head positioning.

2 - Write, Read, Compare Test: Tests the basic diskette operations, including a series of random seeks. Each seek is followed by a write, read, and comparison of data.

3 - Verify Diskette Test: Verifies data accessing and each sector.

4 - Speed Test: Measures the time required for one revolution of the diskette.

5 - Diskette Change Test: Tests the diskette change signal and write-protect feature as you remove and insert a diskette.

Hard Disk Drive Test Select Menu

This menu allows testing the hard disk drive and the integrated controller.

Hard Disk Drive 0

Hard Disk Drive Test Select Menu

- 1 - Self-Diagnostics
- 2 - Seek Test
- 3 - Write, Read, Compare (on test cylinder)
- 4 - Error Detection and Correction
- 5 - Run Tests 1 through 4
- 6 - Read Verify
- 7 - Format Hard Disk

Press Esc to exit or
select a number and press Enter.

1 - Self-Diagnostics: Runs self tests on the hard disk drive.

2 - Seek Test: Sequentially moves the hard disk heads inward one cylinder at a time until the last cylinder is reached. The heads then reset to the first cylinder and a random seek test is performed.

3 - Write, Read, Compare (on test cylinder): Data is written to the test cylinder by each hard disk head. The data is then read and checked for any errors.

4 - Error Detection and Correction: Tests the hard disk error checking and correction circuits by reading data, altering the data, and writing the data on the test cylinder. A comparison test is made to detect any errors.

5 - Run Tests 1 through 4: Runs tests 1, 2, 3, 4, and also reads track 0.

6 - Read Verify: A read operation is performed on the entire hard disk drive. Any tracks that cannot be read are reported with existing defects.

7 - Format Hard Disk: Selects the Format select menu for the hard disk drives.

Formatting a Hard Disk Drive

Hard disk drives normally contain tracks in excess of their stated capacity to allow for defective tracks. The user is notified by a diagnostic message when the defect limit has been reached and service is recommended.

The Diagnostics Format program is different from the operating system format program. Before you can transfer information from the backup diskettes to the hard disk drive, the hard disk drive must be formatted using the operating system format program. Refer to your operating system's manual for a description of the hard disk preparation commands.

Note: The Diagnostics Format program on this diskette might damage non-IBM hard disk drives. Refer to the documentation that came with the drive for low-level formatting information.

Warning: Formatting or surface analysis destroys all data on the hard disk drive, including system programs. If you are directed to or elect to format the hard disk drive, prior to formatting you must ensure that the data is backed up, if possible.

Formatting Procedure

Before replacing a failing hard disk drive, try to format it as follows:

1. Power-off the computer. Check that the hard disk drive cable is tightly connected.
2. Insert the diagnostics diskette into drive A.
3. Power-on the computer.
4. Press **1 (Test the System)**, then press **Enter**.
5. Depending on the options installed in the computer, questions about attached devices appears on the screen. Answer as required, then press **Enter**.
6. If the list is incorrect, run the Configuration Utility program (see "Power-On Self Test (POST)" on page 6-17). Check to see if any adapter or device is set to a conflicting address with any other adapter or device. Also be sure that any adapter or device missing from the list is not set to "disabled."
Press **Y (Is this list correct? (Y/N))**, then press **Enter**.
7. Press **1 (Run tests ONE time)**, then press **Enter**.
8. Press **99 (Bypass () all tests)**, then press **Enter**.
9. Select **Hard Disk Drive**, then press **Enter**. The Hard Disk Drive test begins.

10. At the Hard Disk Drive Test Select Menu, press 7, then press **Enter**.
11. Press **Y (Do you want to continue? (Y/N))**, then press **Enter**.
12. Press **Y (This is your last chance to cancel! Do you want to continue? (Y/N))**, then press **Enter**.

Formatting progress is displayed on the screen.

Video Test Select Menu

This menu allows testing the SVGA displays and control logic on the system board.

```
Video Test Select Menu

1 - SVGA/Video Memory Test
2 - Text Mode Tests
3 - Screen Paging Test
4 - Run Tests 1 through 3
5 - VGA Graphics Mode Test Menu
6 - SVGA Graphics Mode Test Menu
7 - Full Screen Raster
8 - Focus

Press Esc to exit or
select a number and press Enter.
```

- 1 - SVGA/Video Memory Test: Verifies the video portion of the system board.
- 2 - Text Mode Tests: Shows the following character attributes: normal and high intensity, reverse video, blinking, non-display, and (for color displays) 15 EGA color attributes.
- 3 - Screen Paging Test: Preloads 8 pages of video memory with appropriate page numbers, then displays each page for verification.
- 4 - Run Tests 1 through 3: Performs tests 1 through 3 on an SVGA display.
- 5 - VGA Graphics Mode Test Menu: Displays a menu to select the display VGA graphics modes.
- 6 - SVGA Graphics Mode Test Menu: Displays a menu to select the display SVGA graphics modes.
- 7 - Full Screen Raster: Cycles through a full raster of white, pure blue, green, and red. Press any key to cycle.
- 8 - Focus: Displays a screen of black/white and white/black 'M's. Press any key to toggle from one to the other.

Error Log

Use the following steps to create an error log, run the diagnostic tests, and automatically record any error messages in an error log. This procedure is generally used to diagnose an intermittent problem.

Notes:

1. The errors can be logged to a diskette drive, to a hard disk drive, or to a printer.
(You cannot run any diskette test when logging to a diskette drive.)
2. OS/2 systems must be logged to a diskette drive.

Creating the Error Log

1. Load the diagnostics diskette from drive A.
2. Press **1 (Test the System)**, then press **Enter**.
3. Press **N** to answer the test diskette question, then press **Enter**.
4. Press **Y** or **N (Is this list correct?)**, then press **Enter**.
5. Press **3 (Start Error Log)**, then press **Enter**.
6. Press **1** to log to a diskette or hard disk, or press **2** to log to a printer, then press **Enter**.
7. If you are logging to a hard disk drive, press **C, D, E, or F (Enter the error log drive ID)**, then press **Enter**. Go to "Starting the Test" below.
8. If you are logging to a diskette, press **A** or **B (Enter the error log drive ID)**, then press **Enter**.
9. Verify that the diagnostic diskette is installed in the error log drive, A or B, and that it is not write-protected, then press **Enter**.

Starting the Test

1. Press **2 (Run tests MULTIPLE times)**, then press **Enter**.
2. Press **Enter** at the Diagnostic Test Select Menu to run all tests.
3. Select the number of times to run the tests, then press **Enter**.
4. Press **N (Wait each time an error occurs? (Y/N))**, then press **Enter**.
5. Follow any instructions on the screen and select any requested tests.

Note: Do not press any keys during the keyboard test.

6. To end a continuous test, press **Ctrl+C**. The computer completes testing, then returns to the System Checkout menu.

Displaying the Error Log

1. Depending on the options installed in the computer, questions about attached devices appear on the screen. Answer as required, then press **Enter**.
2. From the System Checkout menu, Press **Esc**.
3. Press **4 (Display Error Log)**, then press **Enter**.
4. Press **A, B, C, D, E, or F (Enter the error log drive ID)**, then press **Enter**. (If logging to a diskette drive, the diagnostic diskette must be in the error log drive selected.) The error log is displayed.
5. Press **F3** to leave the error log.

Keyboard

Note: If a mouse or other pointing device is attached, remove it to see if the error symptom goes away. If the symptom goes away, the mouse or pointing device is defective.

001

- Power-off the computer.
- Disconnect the keyboard cable from the system unit.
- Power-on the computer and check the keyboard cable connector on the system unit for the voltages shown.

All voltages are $\pm 5\%$.

Pin	Voltage (Vdc)
1	+5.0
2	Not Used
3	Ground
4	+5.0
5	+5.0
6	Not Used

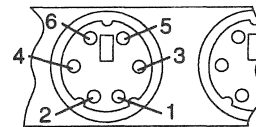


Figure 6-2. Keyboard connector voltages

ARE THE VOLTAGES CORRECT?

Yes No

002

Replace the system board.

003

On keyboards with a detachable cable, replace the cable. If the problem remains or if the cable is permanently attached to the keyboard, replace the keyboard. If the problem remains, replace the system board.

Printer

1. Make sure the printer is properly connected and powered on.
2. Run the printer self-test.

If the printer self-test does not run correctly, the problem is in the printer. Refer to the printer service manual.

If the printer self-test runs correctly, install a wrap plug in the parallel port and run the diagnostic tests to determine which FRU failed.

If the diagnostic tests (with the wrap plug installed) do not detect a failure, replace the printer cable. If that does not correct the problem, replace the system board or adapter connected to the printer cable.

Power Supply

If the power-on indicator is not on or if the power-supply fan is not running, check the power cord for proper installation and continuity. Verify that the voltage-selector switch is set for the correct voltage.

If this setting is correct, check the power supply connector voltages shown below. The power supply connector is located at the right rear of the system board.

Note: These voltages must be checked with the power supply cables connected to the system board.

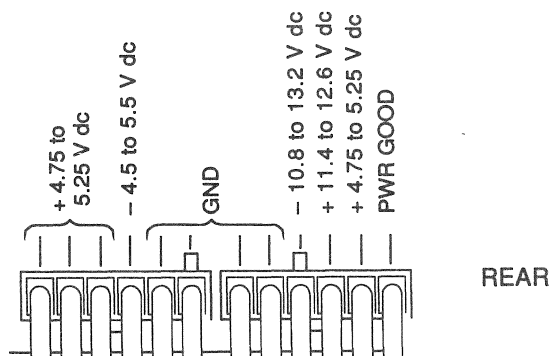


Figure 6-3. Power supply connector voltages

If the voltages are not correct:

- Check the power cord for continuity.
- Check the on/off switch for continuity.
- Replace the power supply.

Chapter 7. Removal and Replacement Procedures

This chapter describes the step-by-step procedures for removing and replacing features and field-replaceable units (FRUs) within the 7585 Industrial Computer.

These procedures should be performed only by trained service personnel, because performing steps incorrectly could lead to personal injury or machine damage.

Use the figures at the beginning of this chapter to locate components. Before performing any removal and replacement procedures, be sure to read and understand the information in "Safety" on page xx and in "Handling Static-Sensitive Devices" on page I.

CAUTION:

Power must always be switched off before performing any removal/replacement procedures; if possible, electrical power and any backup power source should also be unplugged or otherwise disconnected. To assure that power is switched off and disconnected in the correct order, start every removal and replacement procedure with "Switching Off Power and Disconnecting Cables" on page 7-6.

CAUTION:

Depending on the options installed, this computer's system unit could weigh more than one person can comfortably lift. Do not attempt to lift it by yourself if you think it is too heavy for you.

Warning: Whenever handling electronic components, use precautions to prevent component damage due to electrostatic discharge. Refer to "Handling Static-Sensitive Devices" on page I for a list of those precautions.

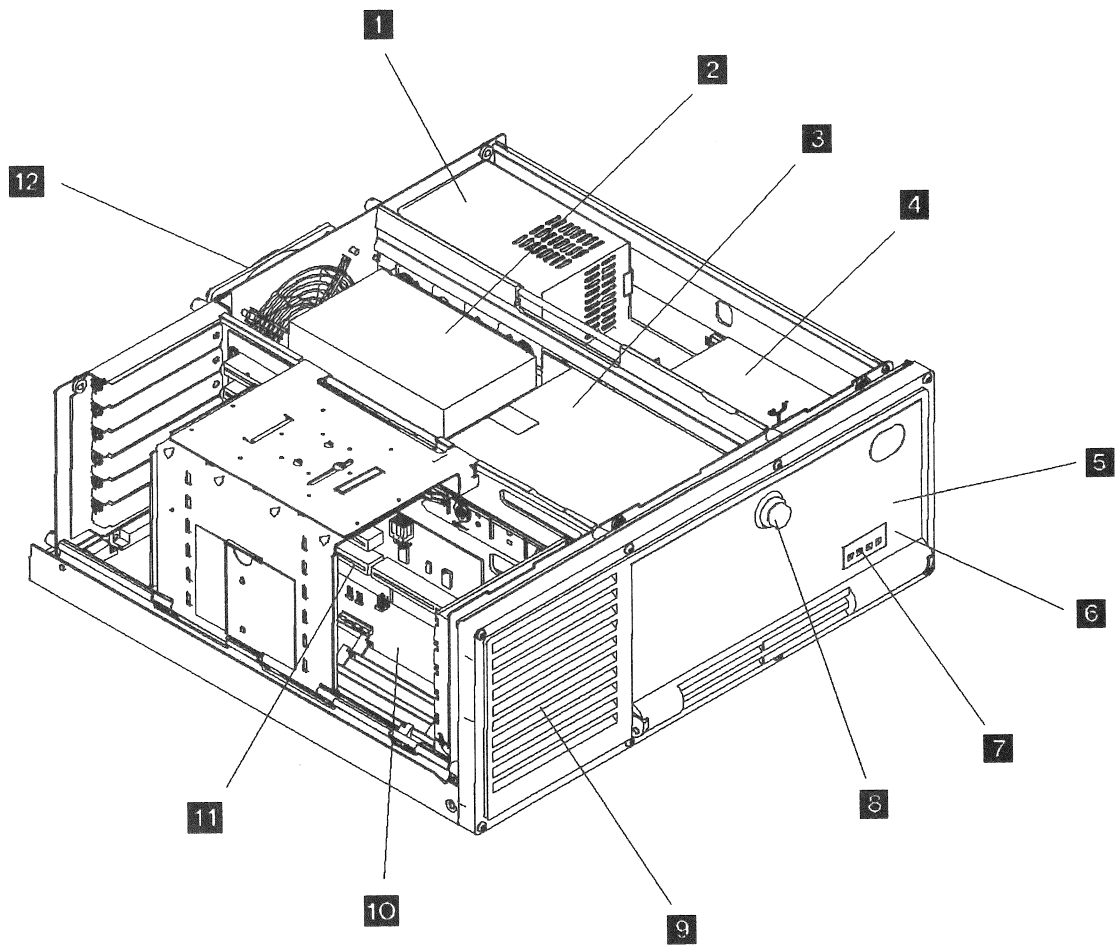


Figure 7-1. General component layout

The major components referenced in Figure 7-1 are:

- 1** Power supply
- 2** 3½ inch hard disk drive in a carrier tray and mounted in a 5¼ inch bay
- 3** 5¼ inch drive (either input/output or storage) mounted in a 5¼ inch bay
- 4** 3½ inch diskette drive mounted in a 3½ inch bay
- 5** Power switch (behind access door)
- 6** Speaker (inside system unit in front bay)
- 7** LEDs (showing through front access door)
- 8** Access door latch
- 9** Front cooling fan and air filter
- 10** System board
- 11** Riser for feature cards (no feature cards shown)
- 12** Rear cooling fan and air filter

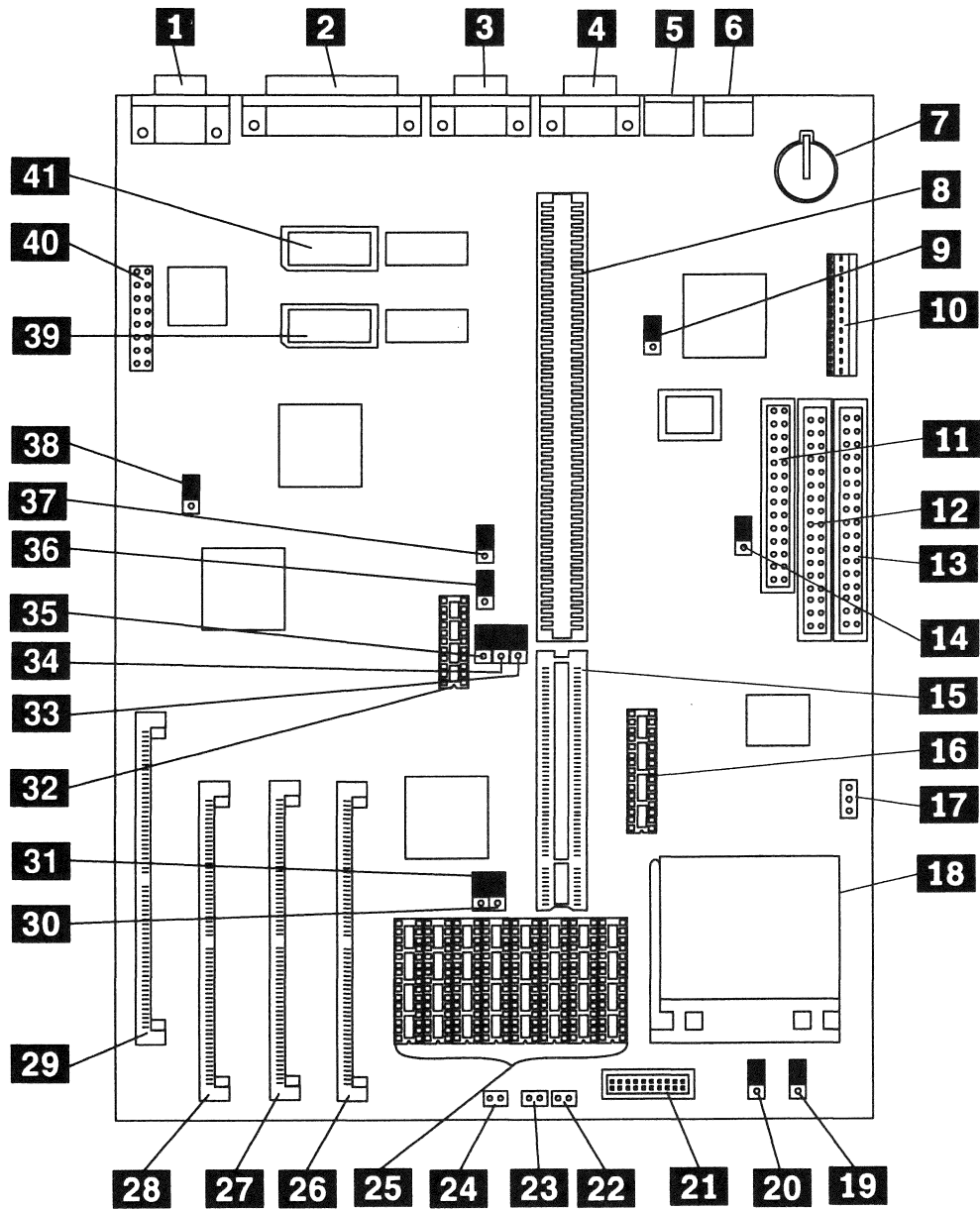


Figure 7-2. System board component locations

The major components referenced in Figure 7-2 are:

- 1 Video port connector
- 2 Parallel port connector
- 3 Serial port B connector
- 4 Serial port A connector
- 5 Mouse port connector
- 6 Keyboard port connector
- 7 Memory retention battery
- 8 Riser connector, ISA (AT) bus
- 9 Mouse disable (IRQ12) jumper
- 10 Power supply connector
- 11 Diskette drive cable connector
- 12 Hard disk drive cable connector, secondary
- 13 Hard disk drive cable connector, primary
- 14 Diskette write-protect jumper
- 15 Riser connector extension, VESA bus
- 16 Cache tag RAM connector
- 17 Microprocessor fan power connector
- 18 Microprocessor socket
- 19 SL enhanced / non-SL processor jumper
- 20 Overdrive / DX jumper (486SX / DX, DX2, DX4, P24T)
- 21 5V / 3V jumper (always installed)
- 22 Power-on LED connector
- 23 Hard disk LED connector
- 24 Speaker connector
- 25 128 / 256KB external cache connectors
- 26 Memory module connector, Bank 1
- 27 Memory module connector, Bank 2
- 28 Memory module connector, Bank 3
- 29 Memory module connector, Bank 4
- 30 128 / 256KB cache jumper
- 31 128 / 256KB cache jumper
- 32 Cache tag RAM connector
- 33 VESA / PCI jumper (VESA to rear)
- 34 VESA / PCI jumper (VESA to rear)
- 35 VESA / PCI jumper (VESA to rear)
- 36 Frequency synthesizer (microprocessor clock speed) jumper
- 37 Frequency synthesizer (microprocessor clock speed) jumper
- 38 Video enable / disable jumper
- 39 Extended video memory connector 1
- 40 Video connector (for test purposes only)
- 41 Extended video memory connector 2

Switching Off Power and Disconnecting Cables

Use the following procedure to power-down the computer system and disconnect all cables **before** beginning any removal/replacement procedure. If it is necessary to remove the system unit from its mounting place, use this procedure **before** removing the system unit.

1. Remove any data media (diskettes, CDs, etc.) from the system unit.
2. Switch off all power to the system unit and any attached devices.
3. Tag all cables connected to the system unit or somehow note their respective connectors to prevent confusing them when they are unplugged.
4. If you have a modem or fax machine attached, disconnect the telephone line from the wall outlet and then from the computer.
5. Unplug or otherwise disconnect all electrical power and any backup power source.
6. Unplug all other cables connected to the system unit. Where applicable, unplug all cables at the receptacle end first, and then at the device end. (For D-shell connectors, remove the two screws that secure each cable to its D-shell connector, and then unplug the cable.)

You are now ready to proceed.

- For computers in which the mounting does not impede access, go directly to "Opening the System Unit" on page 7-7.
- For computers in which the mounting does impede access, go to "Removing the System Unit from its Mounting" on page 7-7.

When reassembling the computer, reverse the above steps.

Removing the System Unit from its Mounting

For some installations, the system unit is mounted in such a manner that access for replacing certain FRUs is limited (for example, rack, bench, etc.). In such cases, it might be necessary to remove the system unit from its mounting place before starting the FRU removal/replacement procedure. This removal varies, depending on your particular mounting method.

Removing the System Unit from a Rack

- For **front rack** servicing, remove the four screws that secure the system unit's front bezel to the front of the rack, and slide the system unit forward with the bezel attached.
- For **rear rack** servicing, remove the eight screws that secure the system unit to the front bezel, and slide the system unit backward.
- If the system unit is rack-mounted on **sliding rails**, it must be removed with the angle-irons attached to the bottom.

When reassembling the computer, reverse the above steps.

Opening the System Unit

Use the following procedure to open the system unit and slide the chassis back for servicing.

1. Unscrew the two knurled thumbscrews near the top on the back of the system unit, until they release. (The two thumbscrews are retained inside the top cover; they will not come out.)
2. Slide the top cover toward the back and then lift it off.

Some components are now accessible without going any further in this procedure. Access to other components will require you to remove other components that are in the way or to slide the chassis back. To slide the chassis back:

1. Unscrew the four knurled thumbscrews on the back of the system unit, until they release.
2. Slide the chassis with its components toward the back.

When reassembling the computer, reverse the above steps.

Feature Cards

All feature cards are removed and replaced in the same way. The feature cards are secured under the feature card retainer. Longer feature cards are held additionally by slots in the front fan guard, while shorter cards do not reach that far.

1. Switch off all power to the computer and disconnect all cables, as described in "Switching Off Power and Disconnecting Cables" on page 7-6.
2. Open the system unit as described in "Opening the System Unit" on page 7-7. (It is not necessary to slide back the chassis.)
3. Open the adapter card retainer as follows:
 - a. Loosen the two screws on the side latch and the larger screw on the top.
 - b. Slide the side latch up to disengage it.
 - c. Extend the retainer side piece straight out and the pivot the the retainer up and out of the way.
4. Unscrew the retaining screw for the feature card to be removed.
5. Disconnect any cables going to that feature card.
6. Remove the feature card from the riser card.

When reassembling the computer, reverse the above steps. Be sure that the feature card retainer properly captures all feature cards.

Memory Retention Battery

CAUTION:

The memory retention battery is a lithium battery. Such batteries present a fire, explosion, or severe burn risk.

- Do not recharge it.
- Do not disassemble it.
- Do not incinerate it or heat it above 100°C (212°F).
- Do not expose its cell contents to water.
- Dispose of the battery as required by local ordinances or regulations.
- When replacing the battery, use only the correct replacement FRU, as defined in the parts catalog section of this manual. Use of another battery could result in ignition or explosion of the battery. Replacement batteries can be ordered from IBM or IBM Authorized Dealers.

Note: When replacing the memory retention battery, you should be prepared to install the new battery within a few minutes. If the memory retention battery is left out for several minutes, it might become necessary to run the configuration utility again.

1. Switch off all power to the computer and disconnect all cables, as described in "Switching Off Power and Disconnecting Cables" on page 7-6.
2. Open the system unit as described in "Opening the System Unit" on page 7-7. (It is not necessary to slide back the chassis.)

Note: If you are not sure where the memory retention battery is located, refer to Figure 7-2 on page 7-4.

3. If your system unit has other components blocking access to the memory retention battery, remove those components next, in order to access the memory retention battery. Refer to the appropriate removal procedure(s) in this chapter.
4. Note the battery's orientation within its holder — that is, with its larger diameter (+ pole) upward. When the battery is replaced, it must be in the same orientation.
5. Using your finger or any small tool, slightly lift the battery and then slide it out.

To replace the battery, reverse the above steps.

Note: Be sure to put the new battery in with its larger diameter (+ pole) upward. When inserting the new battery, slide the battery into place and allow it to seat itself under spring pressure.

RAM Memory Modules (SIMMs)

When replacing a SIMM, be sure to use a new one of the same memory size. Also, be sure to keep the same respective locations for all SIMMs. All SIMMs must be oriented such that their notches are toward the rear of the system board.

1. Switch off all power to the computer and disconnect all cables, as described in "Switching Off Power and Disconnecting Cables" on page 7-6.
2. Open the system unit as described in "Opening the System Unit" on page 7-7. (It is not necessary to slide back the chassis.)

Note: If you are not sure where the memory modules are located refer to Figure 7-2 on page 7-4.

3. If your system unit has other components blocking access to the SIMMs, remove those components next, in order to access the SIMMs. Refer to the appropriate removal procedure(s) in this chapter.

Note: In order to gain access to the SIMMs' latches, it is necessary to remove SIMMs in the order MEM4, MEM3, MEM2, MEM1. When reinstalling, be sure to put each SIMM back into its original socket location. Use these instructions for each SIMM to be removed.

4. Note the SIMM's orientation within its socket, that is, with its notch toward the rear of the system board. When the SIMM is replaced, its notch must be in the same direction.
5. Press outward on the two retainers (located near the ends of the socket) until the SIMM comes free.
6. Grasp the SIMM by its edges and remove it.

To replace the memory module, reverse the above steps. Be sure to insert each SIMM in the correct orientation within its socket, that is, with its notch toward the rear of the system board.

Cache Memory Modules

Each cache memory FRU (either 128KB or 256KB) contains multiple modules. When replacing cache memory modules, you should replace them all.

1. Switch off all power to the computer and disconnect all cables, as described in “Switching Off Power and Disconnecting Cables” on page 7-6.
2. Open the system unit as described in “Opening the System Unit” on page 7-7. (Depending on your particular configuration, it might not be necessary to slide back the chassis.)

Note: If you are not sure where the cache memory modules are located, refer to Figure 7-2 on page 7-4.

3. If your system unit has other components blocking access to the cache memory modules, remove those components next, in order to access the cache memory modules. Refer to the appropriate removal procedure(s) in this chapter.
4. If any RAM memory modules (SIMMs) are installed and you are replacing 256KB of cache memory, note the respective locations of the RAM memory modules, and then remove them.
5. Note the cache memory modules' orientation within their sockets — that is, note the position of their notches or other distinguishing markings. When the modules are replaced, they must be in the same orientation.
6. Carefully lift each cache memory module until it comes free. Using a small flat-bladed screwdriver between the module and its socket, gently pry up the module alternately at both ends until it comes free from its socket.
7. Grasp the cache memory module by its edges and remove it.

To replace the cache memory modules, reverse the above steps. Be sure to insert each cache memory module in the correct orientation within its socket; then press the cache memory module down to seat it.

Video Memory Module

1. Switch off all power to the computer and disconnect all cables, as described in "Switching Off Power and Disconnecting Cables" on page 7-6.
2. Open the system unit as described in "Opening the System Unit" on page 7-7. (It is not necessary to slide back the chassis.)

Note: If you are not sure where the video memory modules are located refer to Figure 7-2 on page 7-4.

3. If your system unit has other components blocking access to the video memory modules, remove those components next, in order to access the video memory module. Refer to the appropriate removal procedure(s) in this chapter.
4. Note each video memory module's orientation within its socket — that is, note the position of its notch or other distinguishing marking. When the module is replaced, the module must be in the same orientation.
5. Carefully lift the video memory module until it comes free. Using a small stiff pin between the module and its socket, gently pry up the module alternately in the holes at both ends until it comes free from its socket.
6. Grasp the video memory module by its ends and remove it.

To replace the video memory module, reverse the above steps. Be sure to insert the video memory module in the correct orientation within its socket; then press the video memory module down to latch it.

Microprocessor

1. Switch off all power to the computer and disconnect all cables, as described in "Switching Off Power and Disconnecting Cables" on page 7-6.
2. Open the system unit as described in "Opening the System Unit" on page 7-7. (Depending on your particular configuration, it might not be necessary to slide back the chassis.)
Note: If you are not sure where the microprocessor is located refer to Figure 7-2 on page 7-4.
3. If your system unit has other components blocking access to the microprocessor, remove those components next, in order to access the microprocessor. Refer to the appropriate removal procedure(s) in this chapter.
4. Note the orientation of the microprocessor within its socket; observe the rows of empty pins on each side of the microprocessor.
5. Lift the lever next to the microprocessor.
Note: Depending on the type of socket holding the microprocessor, there might be a latch protruding over the lever. If so, you must flex the lever slightly to clear the latch. Rotate the lever all the way over to the other side of the socket. This action releases the pins of the microprocessor.
6. Carefully grasp the microprocessor by its edges and lift it out of the socket. As you lift it, note its orientation within its socket; the microprocessor has one beveled corner and one square pin pad on it, both of which align with the beveled corner on the system board. When the microprocessor is replaced, it must be in the same orientation.

To replace the microprocessor, reverse the above steps. Be sure to insert the microprocessor into its socket in the correct orientation — that is, so that its square pin pad and beveled corner are aligned with the beveled corner on the socket; then return the lever to its home position.

Riser Card

1. Switch off all power to the computer and disconnect all cables, as described in "Switching Off Power and Disconnecting Cables" on page 7-6.
2. Open the system unit as described in "Opening the System Unit" on page 7-7. (It is not necessary to slide back the chassis.)
3. Open the adapter card retainer as follows:
 - a. Loosen the two screws on the side latch and the larger screw on the top.
 - b. Slide the side latch up to disengage it.
 - c. Extend the retainer side piece straight out and the pivot the the retainer up and out of the way.
4. Note the locations of all feature cards and cables going to them.
5. Disconnect all cables going to the feature cards.
6. Unscrew the retaining screw for each feature card, and remove all feature cards from the riser card.
7. Remove the two screws securing the riser card.
8. Lift the riser card from its socket on the system board.

When reassembling the computer, reverse the above steps. Be sure that the feature card retainer properly captures all feature cards.

System Board

Note: A new system board comes with no microprocessor or memory options on it. You must transfer all such components from the system board being removed.

To remove and replace the system board, it is necessary to remove all connectors and all replaceable components from the old system board so that you can reinstall them onto the new system board. In this procedure, you will be instructed to note the location and orientation of all such connectors and components before you remove them from the system board. For specific details on component removals, refer to the appropriate other sections in this chapter.

1. Switch off all power to the computer and disconnect all cables, as described in “Switching Off Power and Disconnecting Cables” on page 7-6.
2. Open the system unit and slide back the chassis until you have full access to the system board, as described in “Opening the System Unit” on page 7-7.
3. Open the adapter card retainer as follows:
 - a. Loosen the two screws on the side latch and the larger screw on the top.
 - b. Slide the side latch up to disengage it.
 - c. Extend the retainer side piece straight out and pivot the retainer up and out of the way.
4. Note the locations of all feature cards and cables going to them.
5. Disconnect all cables going to the feature cards.
6. Unscrew the retaining screw for each feature card, and remove all feature cards from the riser card.
7. Remove the two screws securing the riser card.
8. Remove the riser card from the system board.
9. Note the location and orientation of all memory SIMMs on the system board, and then remove them. (For specific details on their removal, refer to “RAM Memory Modules (SIMMs)” on page 7-10.)
10. Note the location and orientation of all video memory modules on the system board, and then remove them. (For specific details on their removal, refer to “Video Memory Module” on page 7-12.)
11. Note the location and orientation of the cache memory module on the system board, and then remove it. (For specific details on its removal, refer to “Cache Memory Modules” on page 7-11.)
12. Note the location and orientation of the memory retention battery on the system board, and then remove it. (For specific details on its removal, refer to “Memory Retention Battery” on page 7-9.)
13. Note the location and orientation of all connectors going from the system board, and then remove them.
14. Remove the screws that secure the system board to the chassis.
15. Slide the empty system board out the left side of the chassis.

When reassembling the computer, reverse the above steps. Before installing the new system board, be sure to set all jumpers on the new system board just like the jumpers on the old system board. While inserting the new system board, use care to prevent damaging it against the chassis side and standoffs. Finally, be sure to install all system board components and cables properly and to capture all feature cards under their retainer. (All connectors are keyed; they can only be attached one way.)

Note: If the new system board does not correct the problem, reinstall the old system board with its old options, but replace the microprocessor.

Diskette Drive

1. Switch off all power to the computer and disconnect all cables, as described in "Switching Off Power and Disconnecting Cables" on page 7-6.
2. Open the system unit and slide back the chassis all the way, as described in "Opening the System Unit" on page 7-7.
3. Remove the front fan filter assembly.
4. Remove the two screws securing the internal front fascia at the top, and pivot the fascia forward to disengage it from the front of the chassis. Set the fascia out of the way. (The wires are long enough so that they may remain connected.)
5. Remove the old drive to be replaced and any other existing removable media drive blocking access to it as follows:
 - a. Disconnect all cables to the drive.
 - b. Slide the drive out the front of the computer. (A front-mounted drive slides out easily.)
6. Set any jumpers, switches, or terminators on the new drive just as those on the old drive are set.
7. Remove the mounting rails from the old drive and attach them to the new drive in the same orientation.
8. If the new drive does not have a black front bezel already installed, install either the new black bezel provided or the old black bezel.

When reassembling the computer, reverse the above steps.

Hard Disk Drive

1. Switch off all power to the computer and disconnect all cables, as described in "Switching Off Power and Disconnecting Cables" on page 7-6.
2. Open the system unit as described in "Opening the System Unit" on page 7-7. (It is not necessary to slide back the chassis.)
3. Remove the old drive to be replaced and any other existing hard drive blocking access to it as follows:
 - a. Disconnect all cables to the drive.
 - b. Loosen the four screws that secure the drive's carrier tray to the two L-shaped side brackets.
 - c. Slide the drive and carrier tray slightly toward the center of the system unit, and lift them out.
4. Set any jumpers, switches, or terminators on the new drive just as those on the old drive are set.
5. Remove the carrier tray from the old drive and attach it to the new drive in the same orientation.

When reassembling the computer, reverse the above steps.

CD ROM Drive

1. Switch off all power to the computer and disconnect all cables, as described in "Switching Off Power and Disconnecting Cables" on page 7-6.
2. Open the system unit and slide back the chassis all the way, as described in "Opening the System Unit" on page 7-7.
3. Remove the front fan filter assembly.
4. Remove the two screws securing the internal front fascia at the top, and pivot the fascia forward to disengage it from the front of the chassis. Set the fascia out of the way. (The wires are long enough so that they may remain connected.)
5. Remove the old drive to be replaced and any other existing removable media drive blocking access to it as follows:
 - a. Disconnect all cables to the drive.
 - b. Slide the drive out the front of the computer. (A front-mounted drive slides out easily.)
6. Set any jumpers, switches, or terminators on the new drive just as those on the old drive are set.
7. Remove the mounting rails from the old drive and attach them to the new drive in the same orientation.
8. If the new drive does not have a black front bezel already installed, install either the new black bezel provided or the old black bezel. Also, install either the new or old gasket.

When reassembling the computer, reverse the above steps.

Power Supply

CAUTION:

Never remove the cover on the power supply. If you have a problem with the power supply, you must replace the power supply FRU or have it serviced by a qualified technician.

1. Switch off all power to the computer and disconnect all cables, as described in "Switching Off Power and Disconnecting Cables" on page 7-6.
2. Open the system unit as described in "Opening the System Unit" on page 7-7. (It is not necessary to slide back the chassis.)
3. Unplug the power cables to all drives within the system .
4. Unplug the two power cables to the system board or power interface card.

Note: If your system has a hard drive installed in the center rear drive bay, you must remove it first in order to access the system board power supply connectors. Refer to "Hard Disk Drive" on page 7-18.

5. Remove the three screws that secure the power supply to the rear mounting bracket.
6. Slide the power supply forward slightly to release it from its side bracket, and lift it out.

When reassembling the computer, reverse the above steps. Note that all connectors from the power supply are keyed; they can only be attached one way.

Warning: Be sure to set the voltage switch on the power supply to the correct position. If you set it to the wrong position, you might damage your computer when you turn it on.

Front Fan

1. Switch off all power to the computer and disconnect all cables, as described in "Switching Off Power and Disconnecting Cables" on page 7-6.
2. Open the system unit and slide back the chassis, as described in "Opening the System Unit" on page 7-7.
3. Disconnect the fan cable connector.
4. Remove the four screws that secure the fan unit and its front and rear fan guards.

When reassembling the computer, reverse the above steps. Be sure that the feature card retainer properly captures all feature cards.

Rear Fan

1. Switch off all power to the computer and disconnect all cables, as described in "Switching Off Power and Disconnecting Cables" on page 7-6.
2. Open the system unit as described in "Opening the System Unit" on page 7-7. (It is not necessary to slide back the chassis.)
3. Disconnect the fan cable connector.
4. Remove the two screws that hold the shroud around the fan; remove the shroud and filter.
5. Remove the four screws that secure the fan unit and its front and rear fan guards.

LED Assembly

1. Switch off all power to the computer and disconnect all cables, as described in "Switching Off Power and Disconnecting Cables" on page 7-6.
2. Open the system unit and slide back the chassis, as described in "Opening the System Unit" on page 7-7.
3. Remove the front fan filter assembly.
4. Remove the two screws securing the internal front fascia at the top, and pivot the fascia forward to disengage it from the front of the chassis.
5. Disconnect the cable(s) going to the LED connector block.
6. Remove the two screws that hold the LED assembly to the fascia, and remove the LED assembly.

When reassembling the computer, reverse the above steps.

Power Switch

1. Switch off all power to the computer and disconnect all cables, as described in "Switching Off Power and Disconnecting Cables" on page 7-6.
2. Open the system unit and slide back the chassis, as described in "Opening the System Unit" on page 7-7.
3. Remove the front fan filter assembly.
4. Remove the two screws securing the internal front fascia at the top, and pivot the fascia forward to disengage it from the front of the chassis.
5. **At the cable junction**, disconnect the cable coming from the power switch.
6. Push the back of the power switch forward so that the switch snaps out the front of the fascia.

When reassembling the computer, reverse the above steps. Be sure to install the new power switch so that the **O** (off) is downward and the **|** (on) is upward.

Speaker

1. Switch off all power to the computer and disconnect all cables, as described in "Switching Off Power and Disconnecting Cables" on page 7-6.
2. Open the system unit and slide back the chassis, as described in "Opening the System Unit" on page 7-7.
3. Remove the front fan filter assembly.
4. Remove the two screws securing the internal front fascia at the top, and pivot the fascia forward to disengage it from the front of the chassis.
5. Disconnect the speaker cable connector.
6. Slide the speaker carrier tray forward.
7. Snap out the speaker.

When reassembling the computer, reverse the above steps.

Chapter 8. Parts Catalog

Service replacement parts must be ordered by their field-replaceable unit (FRU) numbers. This chapter contains the FRU numbers for all available service replacement parts for the basic 7585 Industrial Computer. FRU numbers for adapter cards, drives, and other optional features should be obtained from the actual components or from the feature kits in which they were provided.

IBM Service Parts Warranty

For IBM service parts warranty information, refer to "Statement of Limited Warranty (Machine)" on page v.

Covers

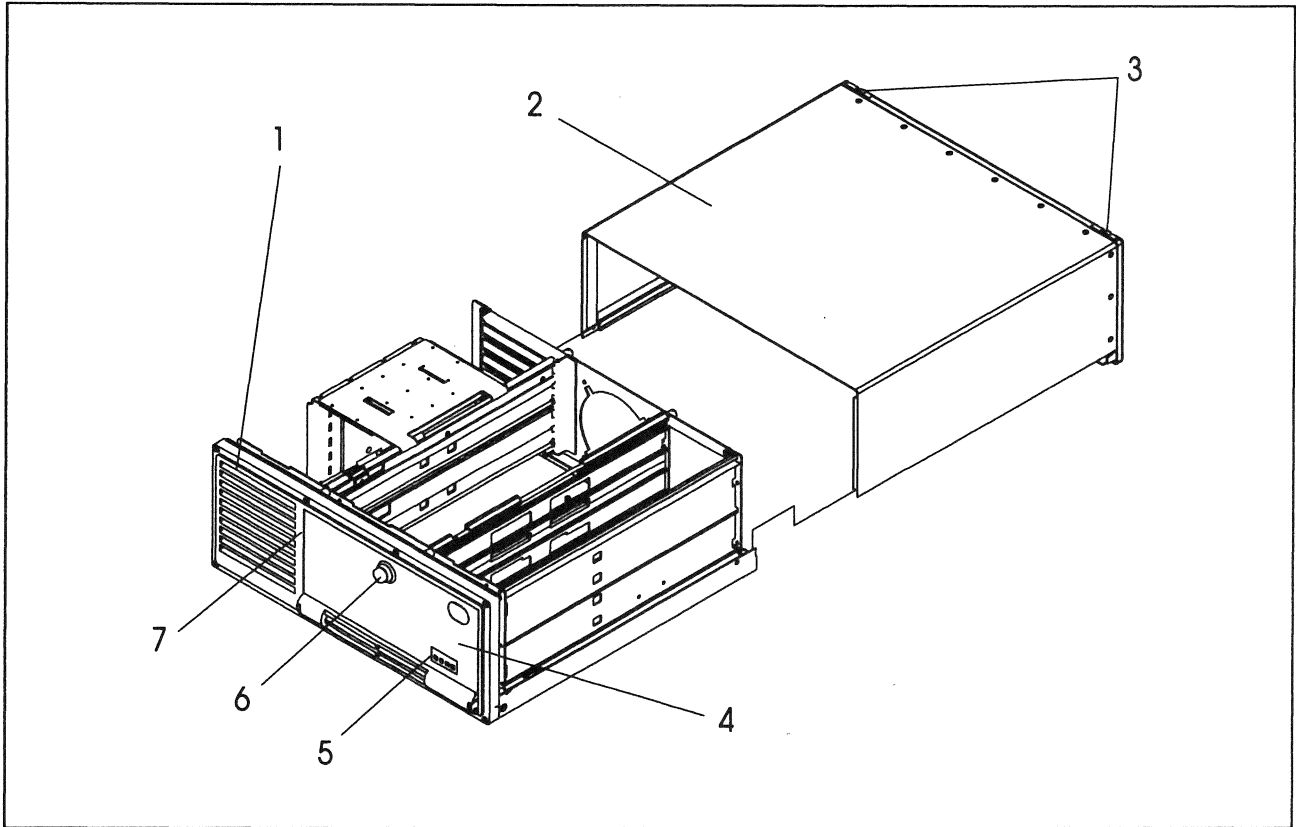


Figure 8-1. Covers

Table 8-1. Covers		
Figure Index Number	FRU Part Number	FRU Description
1	06H4258	Cover assembly, front and bottom (door not included)
2	06H4259	Cover assembly, top (includes 2 bolts)
3	06H4249	Cover bolts (includes 2)
4	06H4257	Door (includes latch assembly and seal)
5	06H4970	Label kit (includes front LED labels and rear icon label, 1 each)
6	06H4255	Door latch assembly
7	06H4256	Door seal

Chassis

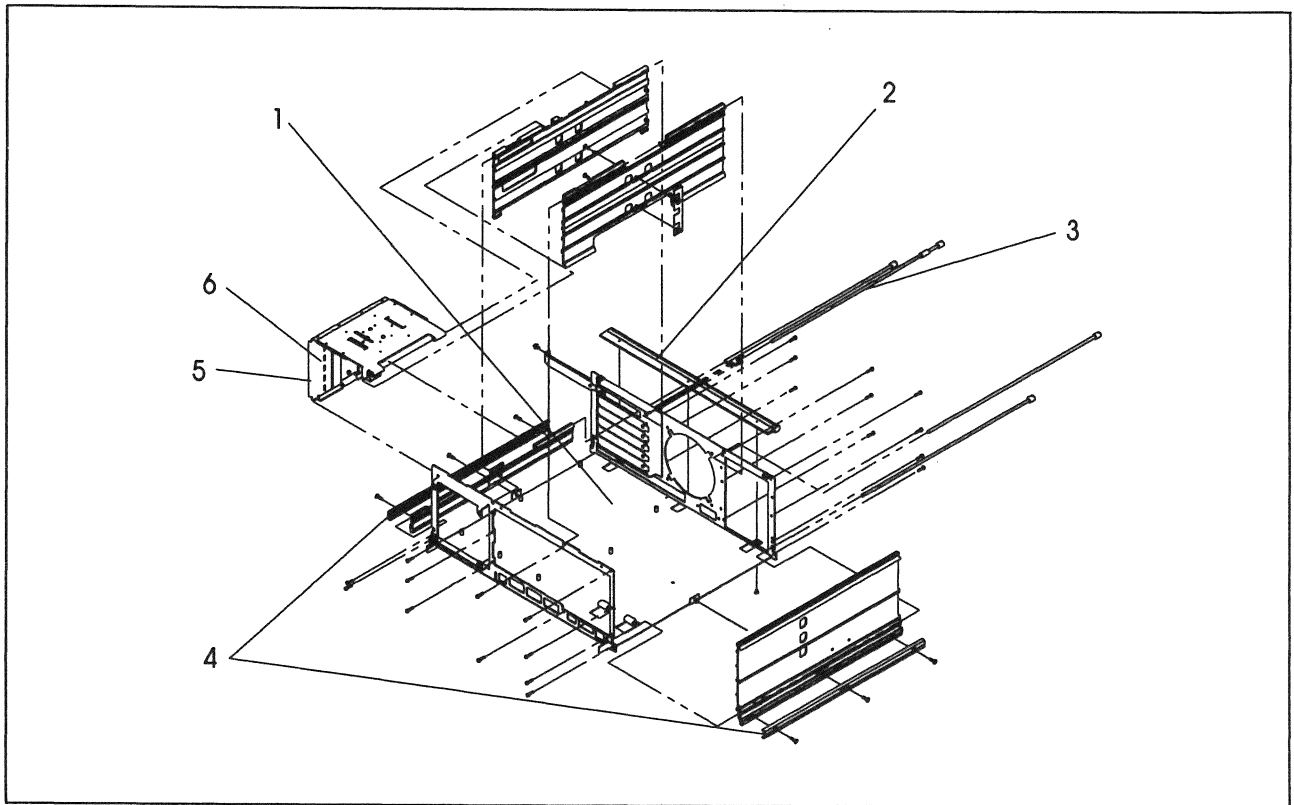


Figure 8-2. Chassis

Figure Index Number	FRU Part Number	FRU Description
1	06H4248	Chassis assembly (includes all parts shown, except card hold-downs and rear trim bezel)
2	06H4272	Rear trim bezel
3	06H4275	Tie bolt and spacer (includes 1 each)
4	06H4267	Slide bushing (includes 2)
5	06H4245	Card retainer assembly (does not include any hold-downs)
6	06H4247	Card hold-down (includes 3)
Not shown	06H4266	Miscellaneous screw assortment

Fans, Power Supply, and Speaker

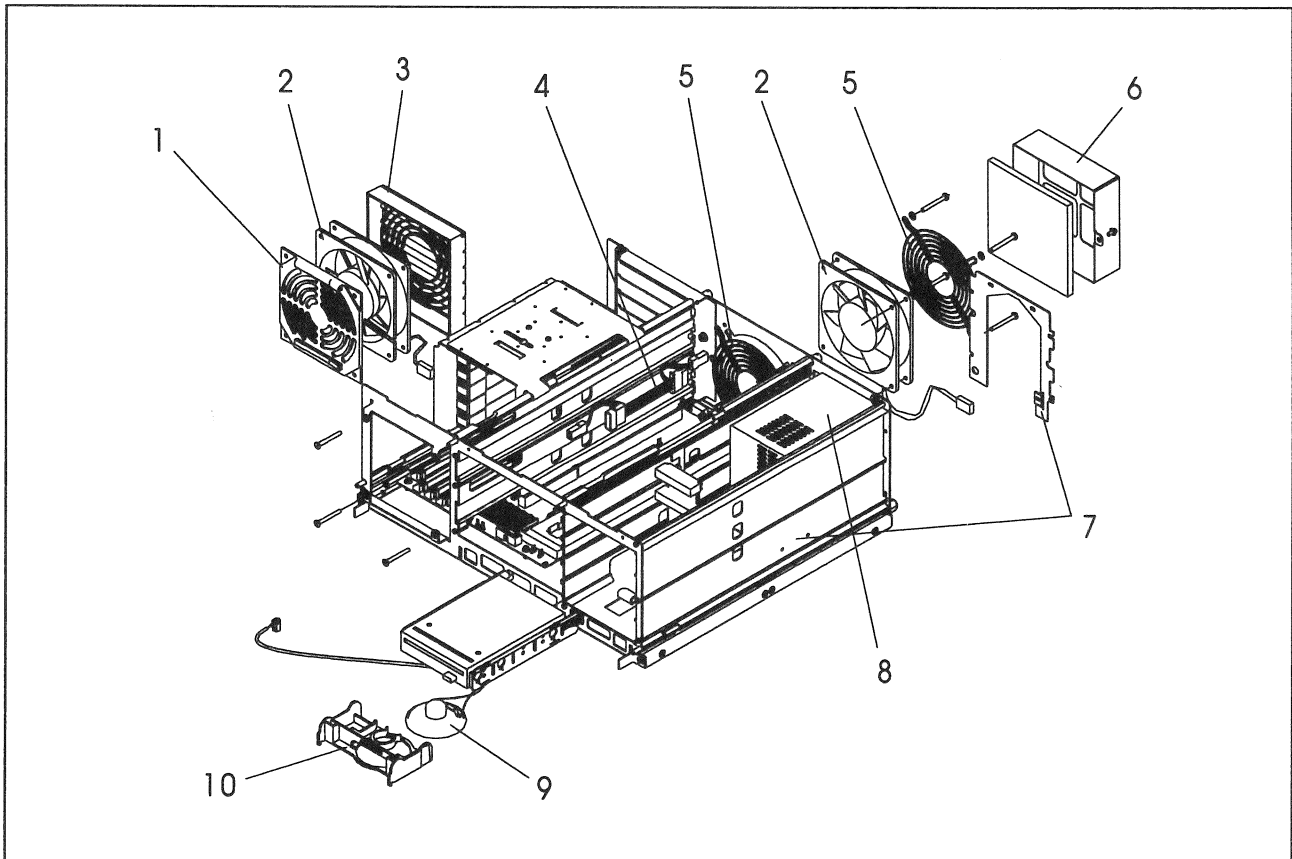


Figure 8-3. Fans, power supply, and speaker

Table 8-3. Fans, power supply, and speaker		
Figure Index Number	FRU Part Number	FRU Description
1	06H4260	Front fan front guard
2	06H4283	Fan assembly (front fan or rear fan)
3	06H4252	Front fan rear guard/card holder
4	06H5661	Fan power cable
5	06H4971	Rear fan guard (front guard or rear guard)
6	06H5963	Cover, fan and filter
7	06H4270	Mounting bracket assembly, power supply (2 pieces)
8	06H3989	Power supply, 200-Watt
9	06H4274	Speaker assembly
10	06H4265	Speaker tray

Air Filters, LEDs, and On/Off Switch

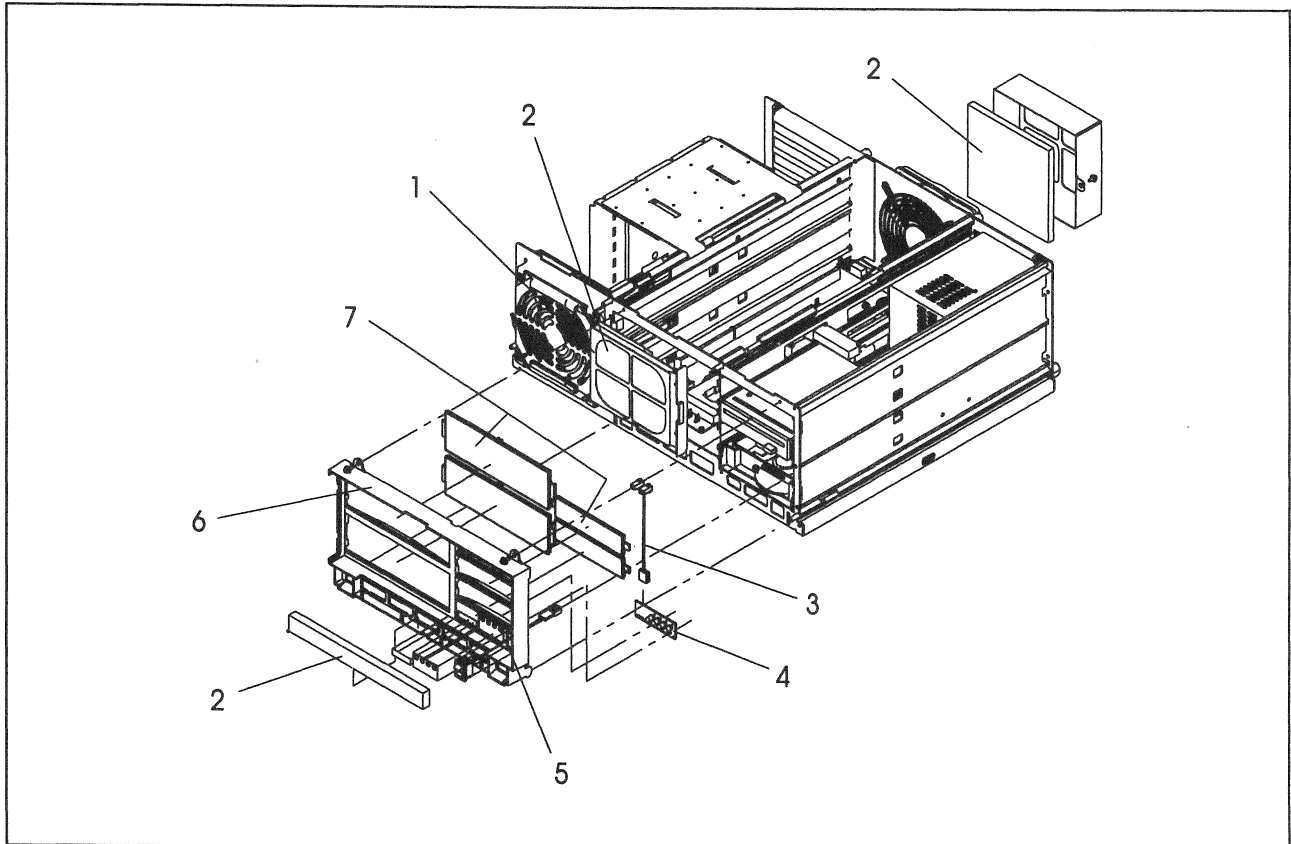


Figure 8-4. Air filters, LEDs, and on/off switch

Figure Index Number	FRU Part Number	FRU Description
1	06H4254	Filter assembly, front fan (includes frame and filter element)
2	06H4253	Filter elements (includes 2 each: front, rear, and door elements)
3	06H4263	LED cable
4	06H4264	LED card assembly
5	06H4268	On/Off switch (with cable)
6	06H4276	Fascia
7	06H4251	Blank bezels, 5¼ inch and 3½ inch (includes 1 each)

Diskette Drive and Mounting

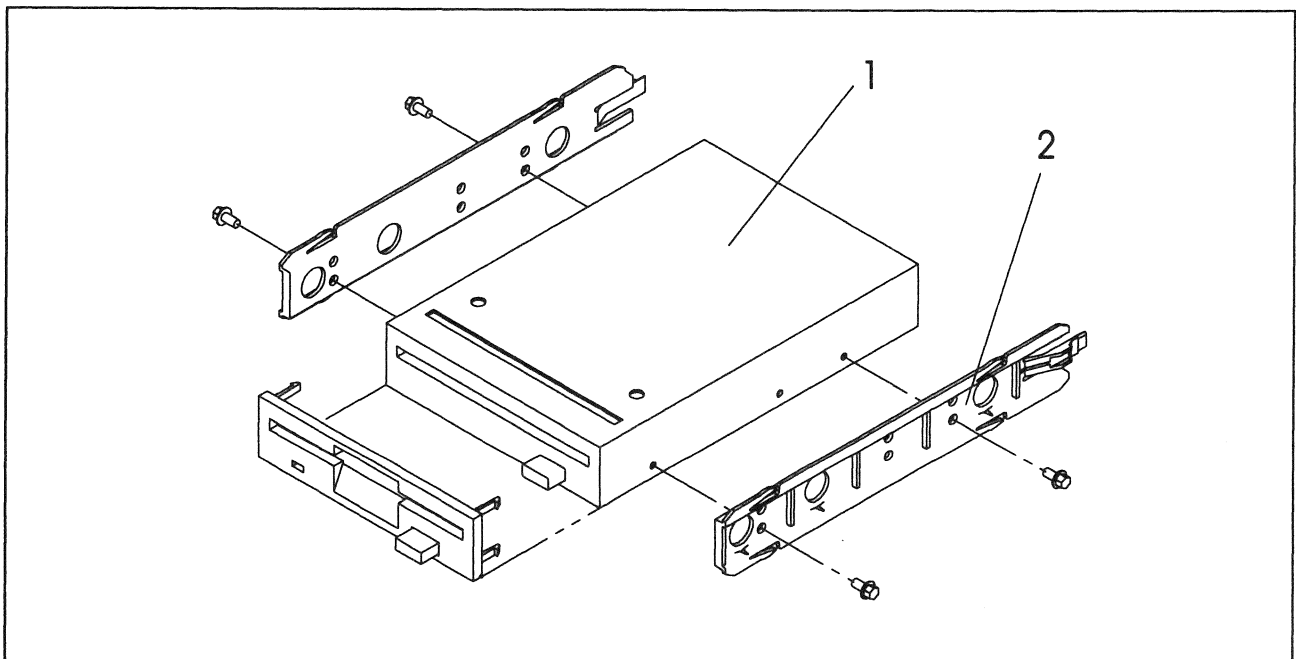


Figure 8-5. Diskette drive and mounting

Figure Index Number	FRU Part Number	FRU Description
1	06H5412	Diskette drive assembly, 3½ inch (includes black bezel and mounting kit)
2	06H4262	Drive mounting kit, 3½ inch bay (includes 2 rails and 4 screws shown)
Not shown	06H4250	Diskette drive cable

Hard Disk Drive and Mounting

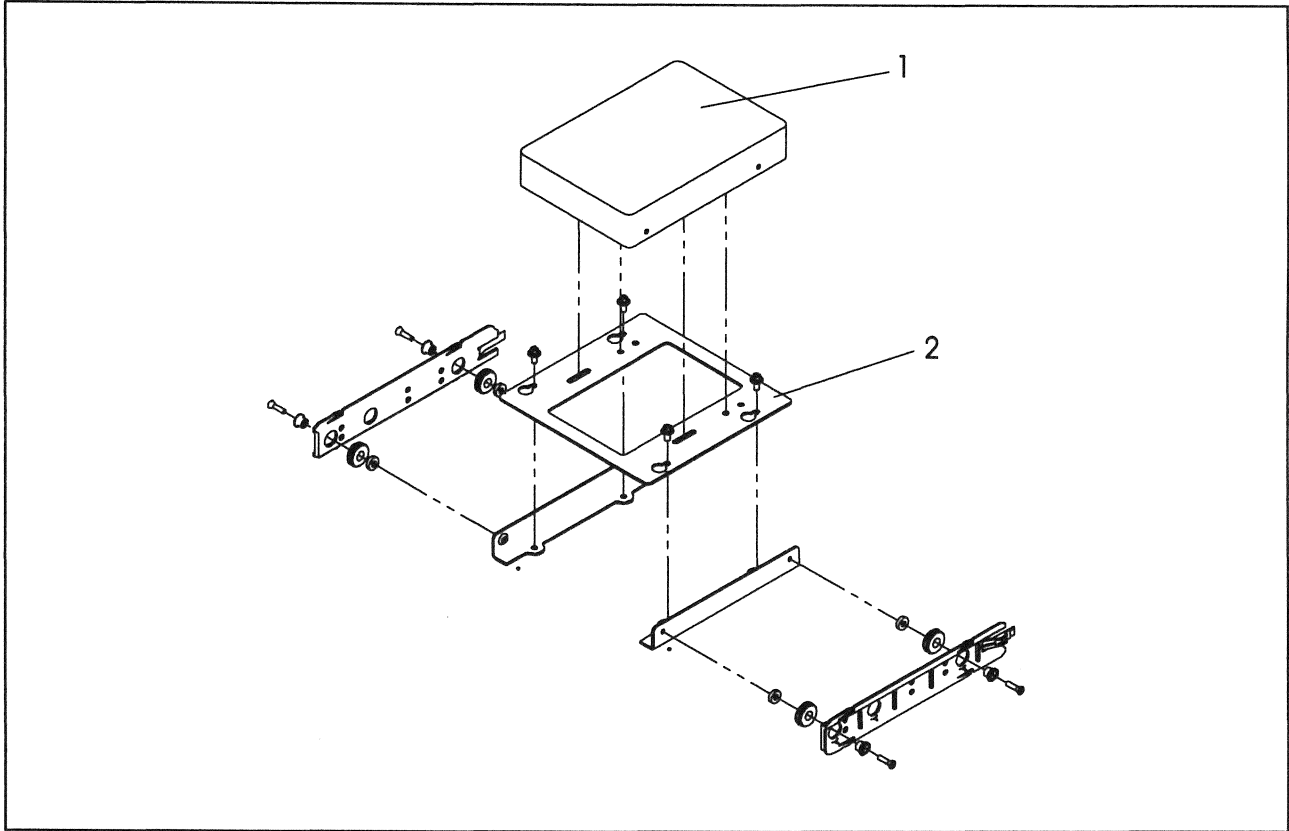


Figure 8-6. Hard drive and mounting

Table 8-6. Hard drive and mounting		
Figure Index Number	FRU Part Number	FRU Description
1	— 82G5926 82G5927 84G6108 82F5929 71G0666	Hard drive, 3½ inch IDE (drive only) 270MB 364MB 527MB 728MB 1GB
2	06H4261	Drive mounting kit, 5¼ inch bay (includes all parts shown, except drive)
Not shown	92F0424	Hard disk drive cable

CD-ROM Drive and Mounting

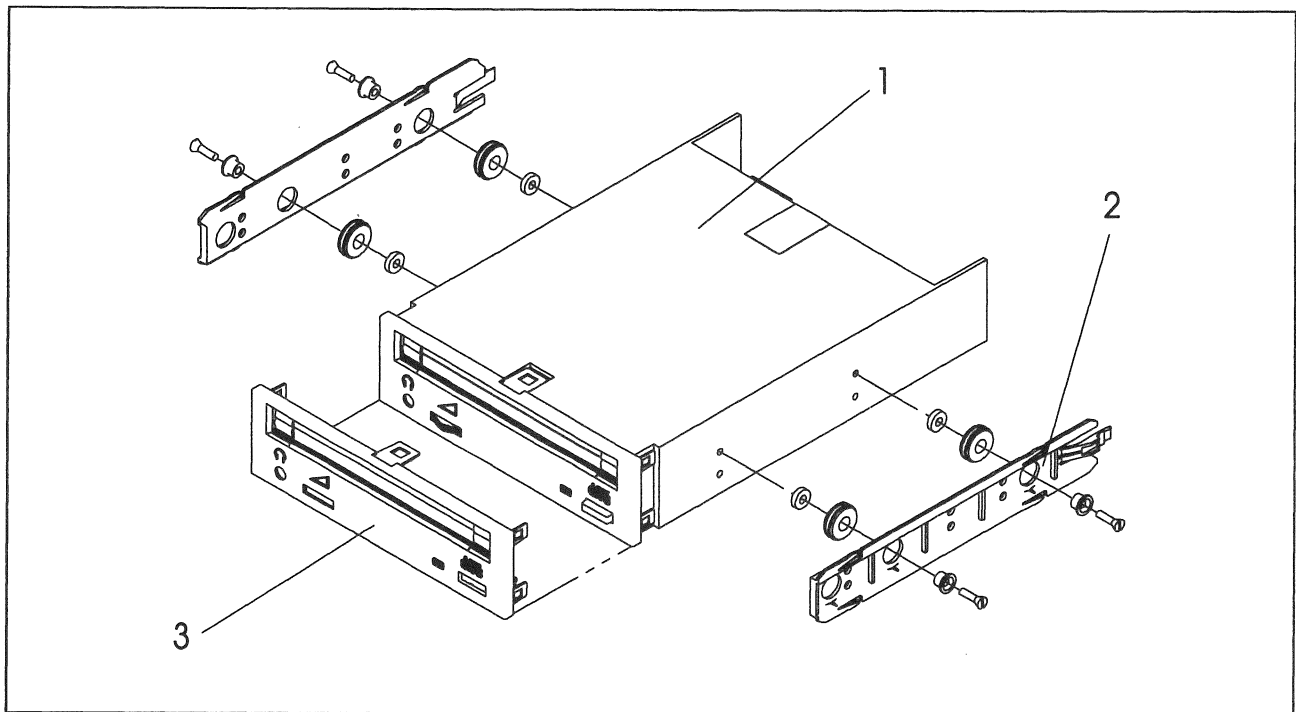


Figure 8-7. CD-ROM drive and mounting

Figure Index Number	FRU Part Number	FRU Description
1	92F0084	CD-ROM drive, 5¼ inch (drive only)
2	06H4261	Drive mounting kit, 5¼ inch bay (includes all parts shown, except drive, black bezel, and seal)
3	06H4246	Bezel kit, CD-ROM drive (includes black bezel and seal only)
Not shown	64F0154	CD-ROM drive cable

System Board Components

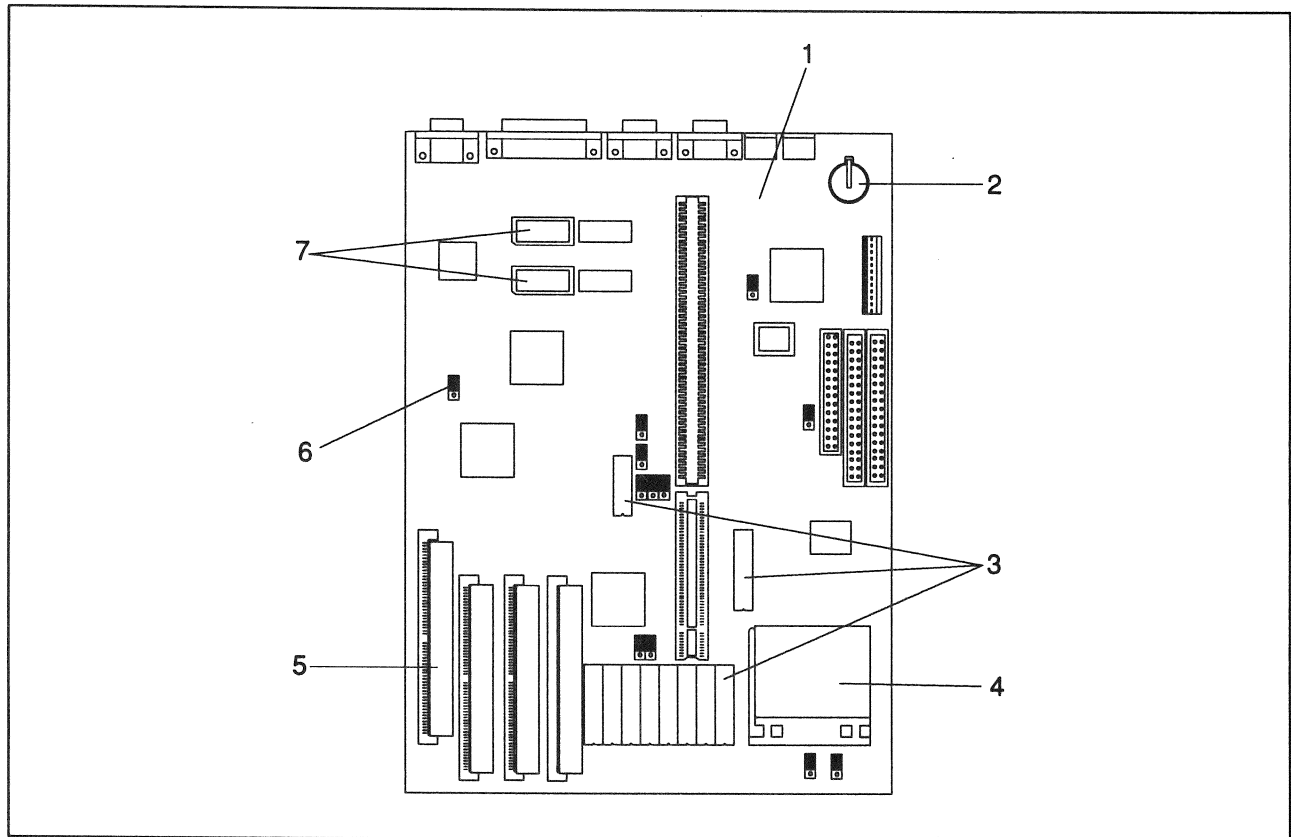


Figure 8-8. System board components

Figure Index Number	FRU Part Number	FRU Description
1	82G2397	System board (includes no memory or processor)
2	33F8354	Battery (lithium), memory retention
3	— 92G7430 92G7431	External cache memory kit 128KB (six modules) 256KB (ten modules)
4	— 71G0791 71G0795 06H4824	Processor 486SX-33 486DX2-66Mhz 486DX4-100Mhz (includes voltage regulator)
5	— 73G3233 73G3234 60G2950 73G3125	RAM memory module (SIMM), 70 nsec 4MB 8MB 16MB 32MB
6	93F0067	Jumper, 2-position (4-pack)
7	92G7432	Video memory kit, 1MB 16 nsec
Not shown	06H4271	Riser card

Rackmount Plates and Handles

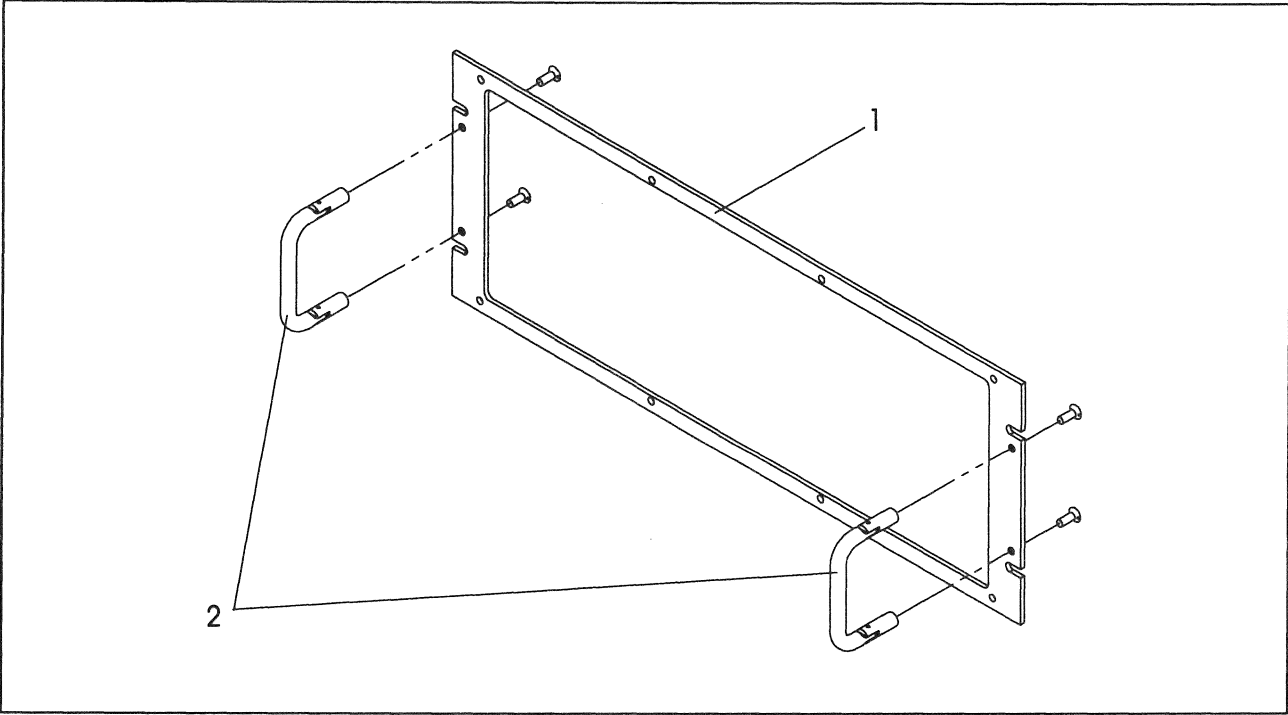


Figure 8-9. Rackmount plates and handles

Table 8-9. Rackmount plates and handles		
Figure Index Number	FRU Part Number	FRU Description
1	—	Rackmount plate with handles
	06H4281	Plate for use with slide rails
	06H4282	Plate for use without slide rails
2	04G2083	Handles, rackmount (includes 2, with screws)

Keyboards

Note: Keyboard FRUs do not include keyboard cable, unless otherwise indicated.

<i>Table 8-10. Enhanced industrial keyboards (101 and 102 keys)</i>	
FRU Number	FRU Description
1394991	Arabic
1394973	Belgian
1394974	Canadian French
1394975	Danish
1394982	Dutch
1394988	English (U.K., ID 166)
1394989	English (U.K., ID 168)
1394972	English (U.S.)
1394977	French (ID 120)
1394976	French (ID 189)
1394978	German
1394990	Hebrew
1394979	Italian (ID 141)
1394980	Italian (ID 142)
1394983	Norwegian
1394984	Portuguese
1394985	Spanish
1394981	Spanish (Latin American)
1394986	Swedish/Finnish
1394987	Swiss/German/French
1393681	Turkish (ID 179 PS/2 Keyboard)

<i>Table 8-11. Space-Saving keyboards (84 keys)</i>	
FRU Number	FRU Description
41G3556	Belgian
41G3559	Canadian French
41G3558	Dutch
41G3549	English (U.K.)
41G3548	English (U.S.)
41G3551	French
41G3552	German
41G3553	Italian
41G3554	Spanish
41G3555	Spanish (Latin American)
41G3550	Swedish
41G3560	Swiss/German/French
41G3557	Turkish

<i>Table 8-12. Enhanced keyboard with TrackPoint II (includes cable)</i>	
FRU Number	FRU Description
06H4842	English (U.S.)

<i>Table 8-13. Keyboard cable</i>	
FRU Number	FRU Description
72X8537	Keyboard cable

Power Cords

Table 8-14 (Page 1 of 2). Power Cords

FRU Number	FRU Description
13F9979	Afghanistan
13F9979	Angola
14F0033	Antigua
72X8508	Argentina
72X8508	Australia
13F9979	Austria
62X1045	Bahamas
14F0033	Bahrain
14F0015	Bangladesh
62X1045	Barbados
13F9979	Belgium
62X1045	Bermuda
62X1045	Bolivia
62X1045	Brazil
14F0033	Brunei
13F9979	Bulgaria
14F0015	Burma
16F2258	Canada
62X1045	Cayman Islands
14F0069	Chile
62X1045	Colombia
62X1045	Costa Rica
14F0033	Cyprus
13F9979	Czechoslovakia
13F9997	Denmark
62X1045	Dominican Republic
14F0033	Dubia (UAE)
13F9979	Egypt
62X1045	Ecuador
62X1045	El Salvador
14F0069	Ethiopia
13F9979	Finland
13F9979	France
13F9979	Germany
14F0033	Ghana
13F9979	Greece
62X1045	Guatemala
62X1045	Guyana
62X1045	Haiti
62X1045	Honduras
14F0033	Hong Kong
13F9979	Hungary
13F9979	Iceland
14F0033	India
13F9979	Indonesia
13F9979	Iran
14F0033	Iraq
14F0033	Ireland
14F0087	Israel
14F0069	Italy
62X1045	Jamaica
62X1045	Japan
13F9979	Jordan
14F0033	Kenya
62X1045	Korea (South)
14F0033	Kuwait
13F9979	Lebanon
62X1045	Liberia
14F0069	Libya
13F9979	Luxembourg

Table 8-14 (Page 2 of 2). Power Cords

FRU Number	FRU Description
14F0033	Malaysia
14F0033	Malawi
14F0033	Malta
13F9979	Martinique
13F9979	Mauritius
62X1045	Mexico
13F9979	Mozambique
14F0033	Nepal
13F9979	Netherlands
62X1045	Netherlands Antilles
72X8508	New Zealand
62X1045	Nicaragua
14F0033	Nigeria
13F9979	Norway
14F0033	Oman
62X1045	Panama
14F0015	Pakistan
72X8508	Paraguay
62X1045	Peru
62X1045	Philippines
13F9979	Poland
13F9979	Portugal
14F0033	Peoples Republic of China
14F0033	Qatar
13F9979	Romania
13F9979	Russia
62X1045	Saudi Arabia
14F0033	Sierra Leone
14F0033	Singapore
14F0033	Somalia
14F0015	South Africa
13F9979	Spain
14F0015	Sri Lanka
13F9979	Sudan
62X1045	Surinam
13F9979	Sweden
14F0051	Switzerland
13F9979	Syria
62X1045	Taiwan
14F0033	Tanzania
16F2258	Thailand
62X1045	Trinidad
13F9979	Turkey
14F0033	Uganda
14F0033	United Kingdom
62X1045	United States
72X8508	Uruguay
62X1045	Venezuela
13F9979	Zaire
14F0033	Zambia
13F9979	Zimbabwe

Part 3. Appendixes

The Appendixes contain supplemental information that is generally not required by the user or service person. Much of the information in the Appendixes is useful in planning computer system configuration and physical site preparation.

Appendix A. System Records	A-1
Appendix B. 7585 Industrial Computer Physical Dimensions	B-1
Appendix C. Jumpers	C-1
Changing Jumper Positions	C-1
Jumper Descriptions	C-2
Appendix D. Interrupt and DMA Assignments	D-1
Interrupt Request Assignments	D-1
DMA Channel Assignments	D-2
Appendix E. S3 Vision864 SVGA Device Drivers Installation Instructions	E-1
Introduction to Device Drivers	E-2
Change the Refresh Rate	E-3
Refresh from AUTOEXEC.BAT	E-4
Refresh in Graphical Mode	E-5
Refresh From the Command Line	E-6
Microsoft Windows Version 3.1 Drivers	E-7
Installation	E-7
Updating the Device Drivers	E-8
DOS Drivers / Utilities	E-9
DataCAD Version 4.06 Installation	E-9
CADVANCE Version 3.51 Installation	E-11
Generic CADD Version 6.0 Installation	E-12
AutoDesk ADI Version 4.2 Installation	E-13
AutoCAD Release 11 Configuration	E-14
AutoCAD Release 12 Configuration	E-15
AutoShade Version 2.1 Configuration	E-17
3D Studio Version 1.0 Configuration	E-18
3D Studio Version 2.0 Configuration	E-19
MicroStation PC (Protected Mode) Version 4.0 Installation	E-20
MicroStation PC (Protected Mode) Version 5.0 Installation	E-21
LOTUS 1-2-3 Version 2.3 Installation	E-22
Microsoft Word Version 5.0 Installation	E-23

Appendix A. System Records

Use the following tables to keep a record of important information about your computer system. This information can be helpful when you install additional options in your computer or if you ever need to have your computer serviced.

<i>Table A-1. Computer System Identification Numbers</i>	
Industrial Computer Type/Model	_____
Industrial Computer Serial Number	_____
Key Serial Number	_____
Key Address	_____

<i>Table A-2. Internal and External Drives</i>		
Location	Drive Description	SCSI ID
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Note: If you attach a drive or other device to a SCSI adapter, be sure to record the expansion slot number of the adapter in the location field of this table.

Table A-3. Internal and External Options

Location	Option Description
Processor Type	<u>486SX-33</u> <input type="checkbox"/> <u>486DX2-66</u> <input type="checkbox"/> <u>486DX4-100</u> <input type="checkbox"/> Other: _____
Memory (MEM1)	<u>4MB Kit</u> <input type="checkbox"/> <u>8MB Kit</u> <input type="checkbox"/> <u>16MB Kit</u> <input type="checkbox"/> <u>32MB Kit</u> <input type="checkbox"/>
Memory (MEM2)	<u>4MB Kit</u> <input type="checkbox"/> <u>8MB Kit</u> <input type="checkbox"/> <u>16MB Kit</u> <input type="checkbox"/> <u>32MB Kit</u> <input type="checkbox"/>
Memory (MEM3)	<u>4MB Kit</u> <input type="checkbox"/> <u>8MB Kit</u> <input type="checkbox"/> <u>16MB Kit</u> <input type="checkbox"/> <u>32MB Kit</u> <input type="checkbox"/>
Memory (MEM4)	<u>4MB Kit</u> <input type="checkbox"/> <u>8MB Kit</u> <input type="checkbox"/> <u>16MB Kit</u> <input type="checkbox"/> <u>32MB Kit</u> <input type="checkbox"/>
Video Memory	<u>2MB Upgrade Kit</u> <input type="checkbox"/>
Cache Memory	<u>128MB Kit</u> <input type="checkbox"/> <u>256MB Kit</u> <input type="checkbox"/>
Power Supply	<u>200 Watt</u> <input type="checkbox"/> Other: _____
Mouse Connector	<u>IBM Mouse</u> <input type="checkbox"/> Other: _____
Keyboard Connector	<u>Space Saving</u> <input type="checkbox"/> <u>Enhanced</u> <input type="checkbox"/> Other: _____
Display Connector	_____
Expansion Slot 1	_____
Expansion Slot 2	_____
Expansion Slot 3	_____
Expansion Slot 4	_____
Expansion Slot 5	_____
Expansion Slot 6	_____
Parallel Connector	_____
Serial Connector A	_____
Serial Connector B	_____

Appendix B. 7585 Industrial Computer Physical Dimensions

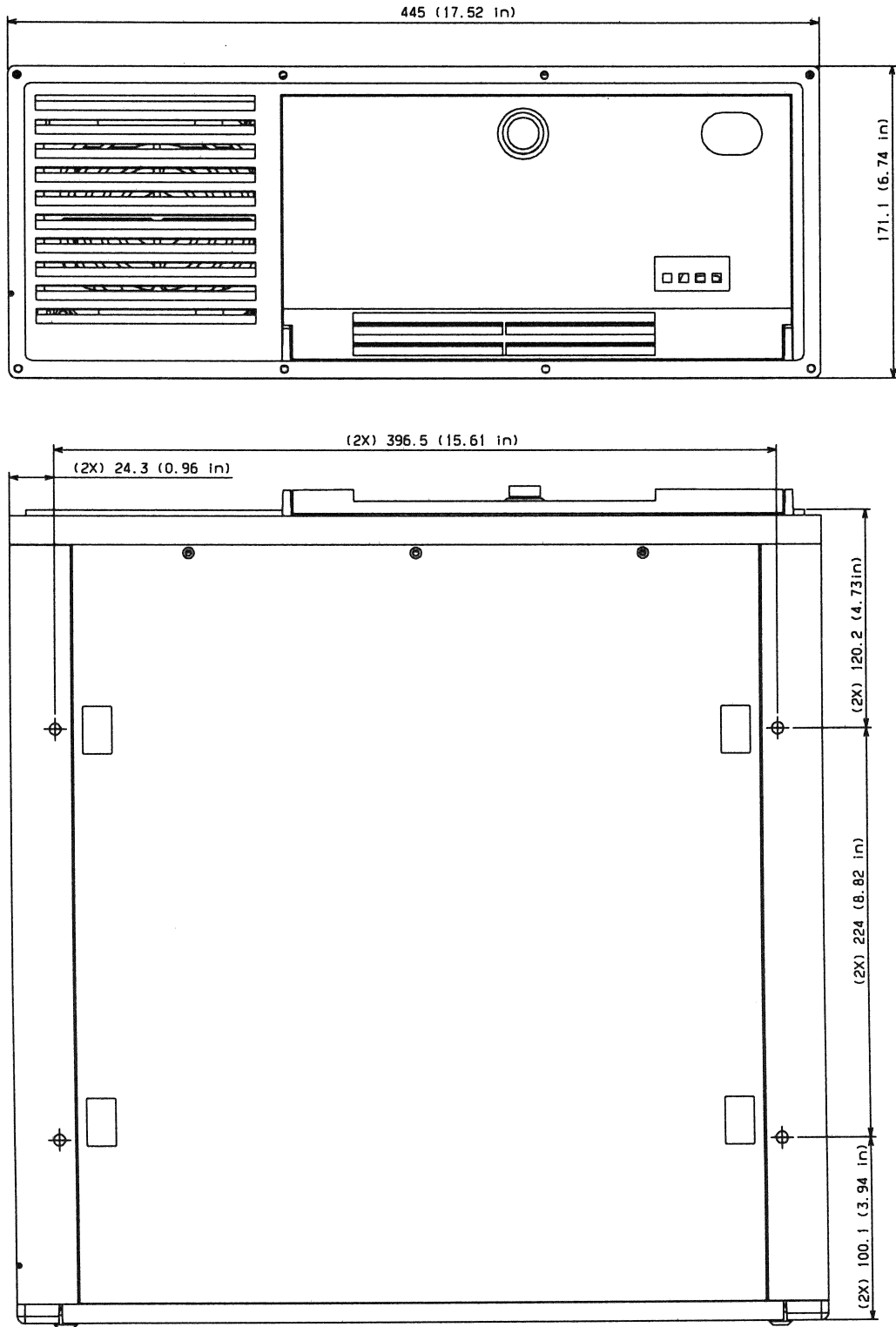


Figure B-1. Front and bottom dimensions

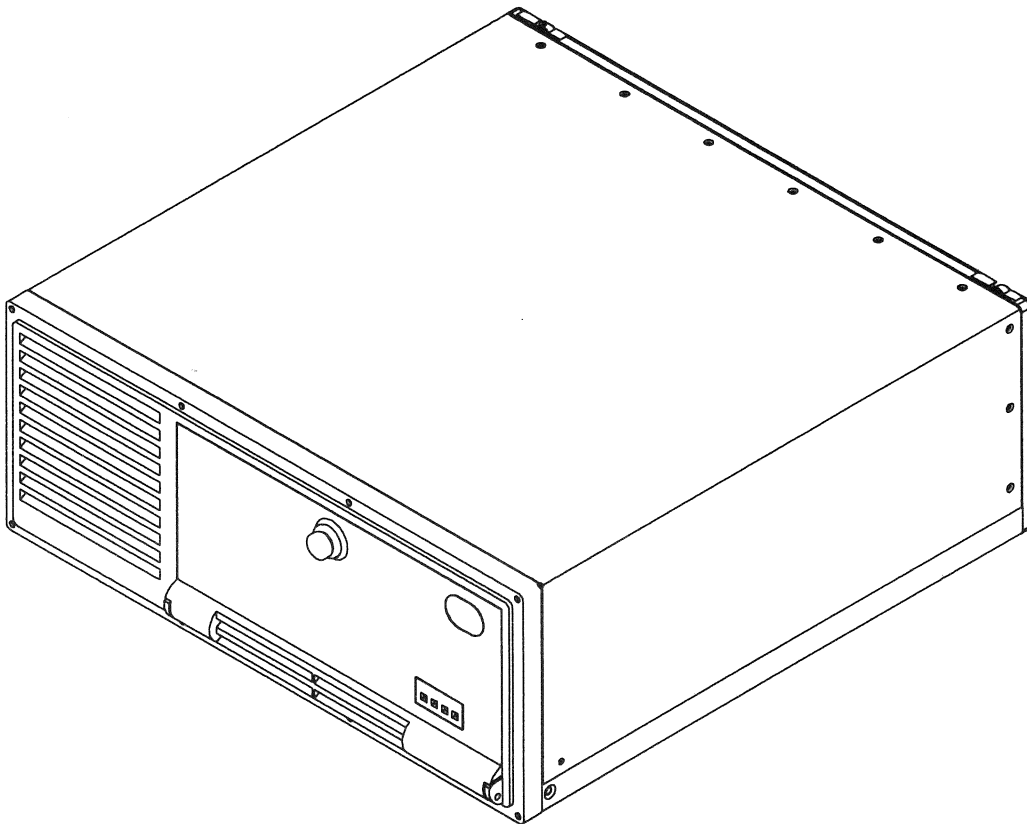
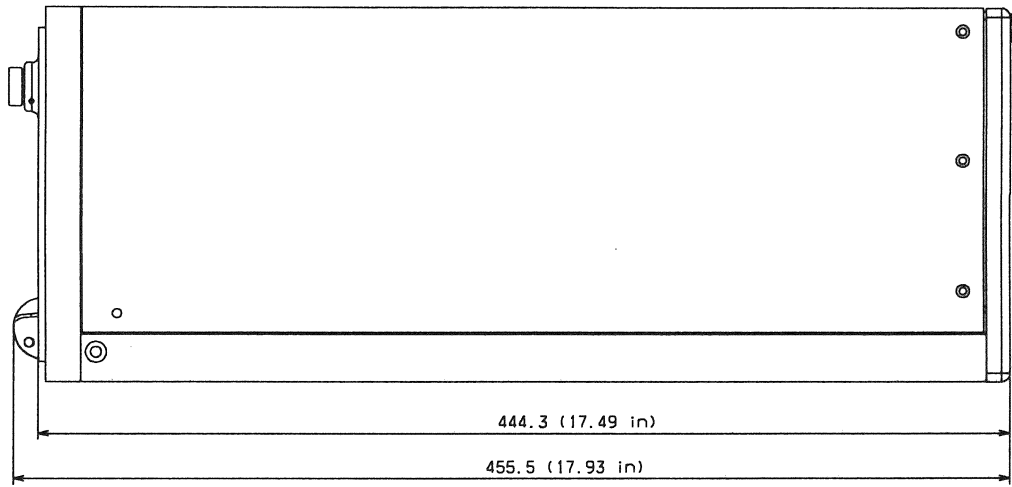


Figure B-2. Side dimensions

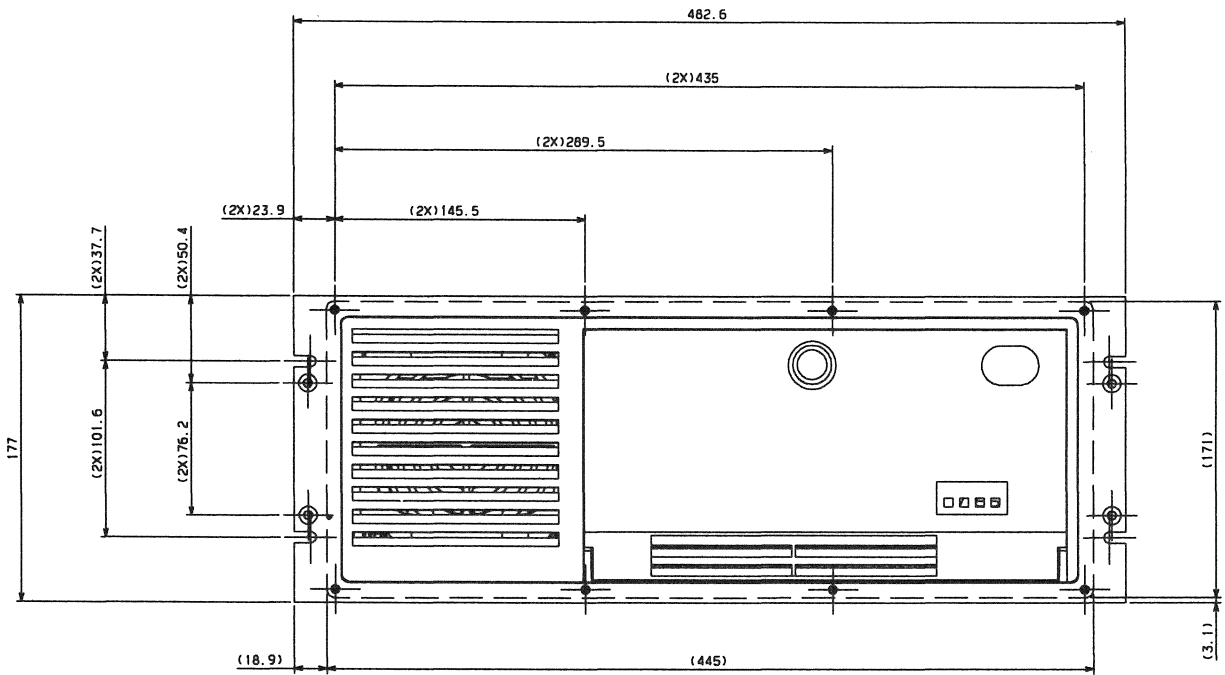


Figure B-3. Rackmount front plate dimensions (without slide rails)

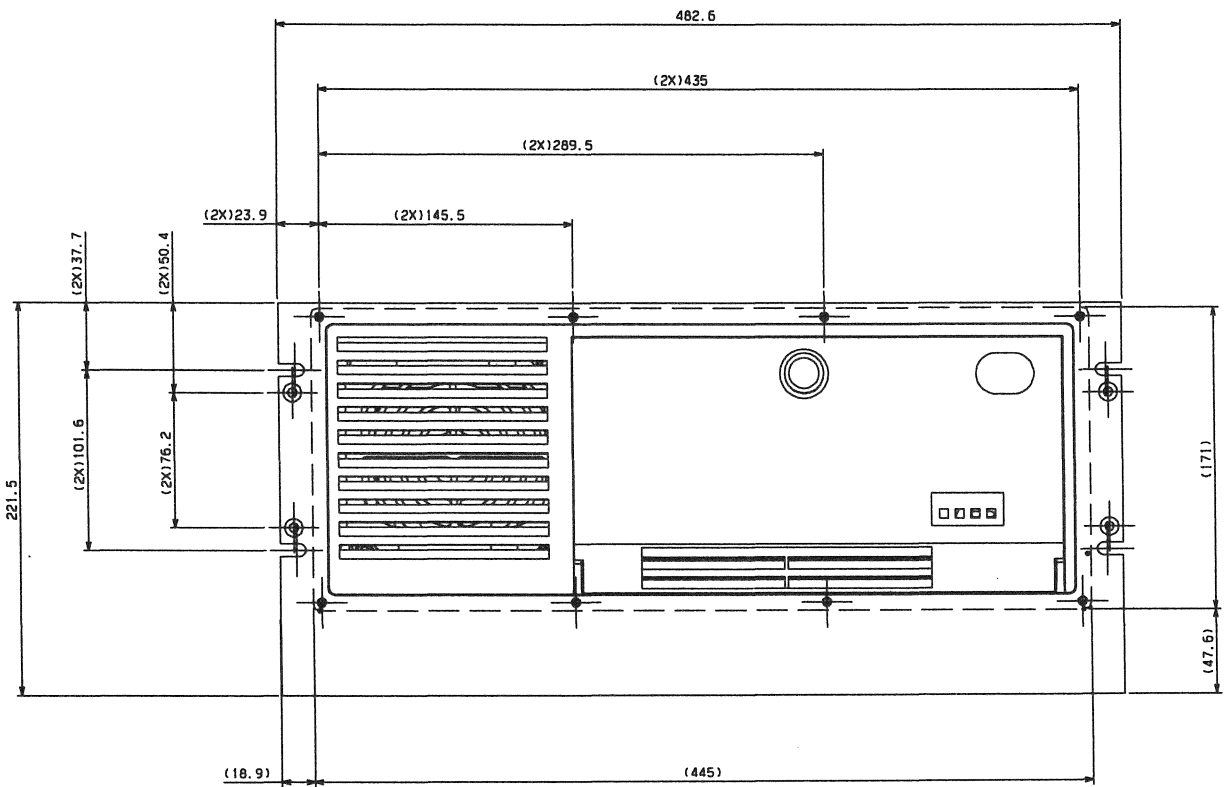


Figure B-4. Rackmount front plate dimensions (with slide rails)

Appendix C. Jumpers

Several jumpers are located on the system board to allow you to customize the way your computer operates:

- Cache-select jumpers (128KB / 256KB)
- Diskette write-protect jumper (WRITE / PROTECT)
- Microprocessor SL jumper (SL-ENHANCED / NON-SL)
- Microprocessor clock speed jumpers (25 / 33 / 40 / 50 MHz)
- Microprocessor upgrade jumper (486SX / DX, DX2, DX4)
- Microprocessor voltage jumper (5V / 3V)
- Mouse disable jumper (IRQ1 / 2)
- Riser select jumpers (VESA / PCI)
- Video adapter jumper (ENABLE / DISABLE)

The exact locations of these jumpers on the system board can be found in Figure 3-1 on page 3-2.

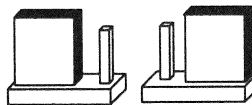
Changing Jumper Positions

Each jumper covers two of the three pins on a pin block and can be positioned to fit over the center pin and either the pin to the rear or to the front of the center pin.

Note: The microprocessor-voltage jumper (5V/3V) is different from the other jumpers on the system board. Depending on the microprocessor installed on the system board, the jumper is either present or is replaced with a voltage-regulator circuit board. This jumper is always present on the 7585.

To change a jumper's position:

1. Disconnect the computer power cord; then turn off computer power.
2. Remove the computer cover.
3. Remove whatever is necessary to gain access to the jumper to be changed.
4. Lift the jumper straight off the pin block.
5. Align the holes in the bottom of the jumper with the center pin and the pin that was not covered previously.
6. Slide the jumper fully onto these pins.



7. Reassemble the components that were removed, and install the computer cover.
8. Reconnect the computer power cord.

Jumper Descriptions

The following table contains the system board jumper identifiers and a description of each jumper. The jumper settings are imprinted on the system board next to the respective jumpers.

Table C-1. Jumper Identifiers and Purpose

Identifier	Description
128KB / 256KB	<p>Cache-select jumpers</p> <ul style="list-style-type: none"> • Use the 128KB position for both jumpers if 128KB of external cache is installed. • Use the 256KB position for both jumpers if 256KB of external cache is installed.
25 / 33 / 40 / 50 MHZ	<p>Microprocessor clock speed jumpers</p> <ul style="list-style-type: none"> • Use the appropriate microprocessor clock speed for the microprocessor you have installed.
5V / 3V	<p>Microprocessor voltage jumper</p> <ul style="list-style-type: none"> • The computer comes with the jumper installed. This jumper is always present on the 7585. (The voltage regulator is included with the 486DX4 microprocessor FRU.)
486SX / DX, DX2, DX4, P24T	<p>Microprocessor upgrade jumper</p> <ul style="list-style-type: none"> • Use the 486SX position if you have a 486SX microprocessor installed in the processor socket. • Use the DX/DX2/DX4 position if you install an 486DX, 486DX2, or 486DX4 microprocessor in the processor socket.
ENABLE / DISABLE	<p>Video adapter jumper</p> <ul style="list-style-type: none"> • Use the ENABLE position to enable the video controller on the system board. • Use the DISABLE position to disable the video controller on the system board and permit use of a video adapter.
IRQ12	<p>Mouse-disable jumper</p> <ul style="list-style-type: none"> • To enable the use of the mouse port, move the jumper to the rear position. • To disable the use of the mouse port, move the jumper to the position nearest the front of the computer. This allows IRQ12 to be used on the AT bus. <p>Note: A serial mouse is not affected by the setting of this jumper.</p>
SL-ENHANCED/ NON-SL	<p>Microprocessor-SL jumper</p> <ul style="list-style-type: none"> • Use the SL-ENHANCED position toward the rear of the computer if you install an SL-enhanced microprocessor in the processor-upgrade socket. • Use the NON-SL position toward the front of the computer if you install in the microprocessor-upgrade socket a microprocessor that is not SL-enhanced. <p>Note: Make sure you know what type of microprocessor (SL-enhanced or non-SL) you have installed. If this jumper is in the wrong position, the microprocessor will not work.</p>
VESA / PCI	<p>Riser-select jumpers</p> <ul style="list-style-type: none"> • Use the VESA position for these jumpers when a riser with VESA-bus capabilities is installed. • Use the PCI position for these jumpers when a riser with PCI-bus capabilities is installed.
WRITE PROTECT	<p>Diskette write-protect jumper</p> <ul style="list-style-type: none"> • To allow writing to a diskette, move the jumper to the rear position. • To prevent writing to a diskette, move the jumper to the position nearest the front of the computer.

Appendix D. Interrupt and DMA Assignments

The tables in this appendix outline the interrupt request assignments and direct memory access (DMA) channel assignments for your computer. If you install industry-standard architecture (ISA)-bus adapters (AT-bus adapters) in your computer, be sure that no interrupts or DMA channels conflict with existing resources. For example, do not set an ISA adapter to use interrupt (IRQ) 14 because IRQ14 is used by the IDE hard disk drive.

Interrupt Request Assignments

The following table outlines the interrupt request assignments.

<i>Table D-1. Interrupt request assignments</i>	
Interrupt Request	System Resource
NMI	Parity error or channel check
0	Reserved (interval timer)
1	Reserved (keyboard buffer full)
2	Reserved (cascade interrupt from slave PIC)
3	Serial port 2
4	Serial port 1
5	Available (parallel port 2, or can be used by either AT- or PCI-bus adapters) (see Note 2)
6	Diskette drive
7	Parallel port 1
8	Real-time clock
9	Available (can be used by either AT- or PCI-bus adapters) (see Note 2)
10	Available (can be used by either AT- or PCI-bus adapters) (see Note 2)
11	Available (can be used by either AT- or PCI-bus adapters) (see Note 2)
12	Mouse port, if enabled; otherwise, it is available
13	Reserved (math coprocessor)
14	IDE hard disk drives
15	Alternate IDE hard disk drives

Notes:

1. Abbreviations:

NMI = non-maskable interrupt
PCI = peripheral component interface
PIC = programmable interrupt controller

2. For interrupts 5, 9, 10, and 11, at least one must be available for PCI adapters if any PCI adapters are installed. Interrupt 9 can be used as the vertical retrace interrupt by some software, so it might not always be available.

DMA Channel Assignments

The following table outlines the DMA channel assignments.

DMA Channel	Data Width	System Resource
0	8 bits	Available
1	8 bits	Available
2	8 bits	Reserved (diskette drive)
3	8 bits	Available (used by parallel port when in extended capabilities (ECP) mode)
4		Reserved (cascade channel)
5	16 bits	Available
6	16 bits	Available
7	16 bits	Available

Appendix E. S3 Vision864 SVGA Device Drivers Installation Instructions

This appendix describes the initial installation of DOS and Microsoft** Windows** device drivers for your 7585 Industrial Computer with the S3** Vision864** super video graphics array (SVGA) subsystem installed on the system board. In addition, this appendix describes the installation of updated video drivers. Updated device drivers are available on the IBM Personal Computer Company Bulletin Board System (PCC BBS). The Bulletin Board System is available 24-hours a day, toll-call only. There is no access charge for the Bulletin Board System.

- In the United States, call the PCC BBS using your data modem at 1-919-517-0001. Modem requirements are: 1200 to 9600 baud, 8 data bits, and 0 parity bits.
- In Canada, FAX your request to Helpfax at 1-800-465-3299, or call one of the following numbers:

Montreal: (514)938-3022
Toronto: (416)492-1823
Markham: (905)946-4255
Vancouver: (604)664-6466

This appendix also describes how to use the Refresh utility to set and change video refresh rates.

Several device drivers and files are discussed in detail in this appendix. They are customized for the application they are used with. These device drivers only support the applications listed in this appendix.

Each application program requires a separate device driver. Verify the supported application programs given in this appendix; if you have any of the programs on your computer's hard disk drive, you should install the corresponding device drivers by following the instructions given for those device drivers.

Introduction to Device Drivers

Your 7585 Industrial Computer comes with the S3 Vision864 SVGA video controller. Some application programs require custom software, known as device drivers, to take full advantage of this video controller. Device drivers are special programs that enable your operating system and application programs to use the advanced capabilities of the S3 video controller. The operating system loads these programs after the hardware is configured.

Note: The device drivers and instructions in this appendix are for DOS and Microsoft Windows programs only. For information on super video graphics array (SVGA) support in OS/2* or other operating systems, refer to the documentation supplied with the product.

Many applications come with drivers compatible with the S3 video controller. If a customized driver for your application is not included, select an SVGA- or VESA-compatible driver from the drivers supplied by the manufacturer.

Device drivers are available on diskettes. You must install the device drivers onto your hard disk drive. The directions on how to install or copy the device driver files are provided. Technical notes and device driver features (if applicable) are provided in README files located in the directories containing the drivers.

The two driver diskettes that came with your 7585 Industrial Computer contain the following device drivers:

- **Windows Applications**
 - Microsoft Windows 3.1
- **DOS only Applications**
 - DataCAD** Version 4.06
 - CADVANCE** Version 3.51
 - Generic CADD** Version 6.0
 - AutoDesk** ADI** Version 4.2 (protected mode)
 - MicroStation** PC (protected mode) Version 4.0
 - MicroStation PC (protected mode) Version 5.0
 - Lotus** 1-2-3** Version 2.3
 - Microsoft Word** Version 5.0

These drivers provide support for greater speed, higher resolution, and more available colors. The AutoDesk ADI Version 4.2 driver also provides additional features when used with the AutoCAD** program.

Your DOS, Microsoft Windows, or application software documentation contains explanations of terms and instructions on how to perform common operations. Refer to the documentation, if necessary, as you perform the steps outlined in the remainder of this appendix.

Change the Refresh Rate

The refresh rate is the speed at which the image on the screen is redrawn. For more information on refresh rate, refer to the manual that came with your display.

There are several ways you can change the video refresh rate. You can change the refresh rate by accessing the Configuration Utility program. The refresh rate you set with the Configuration Utility program becomes the default. When you exit the Configuration Utility program, the computer automatically restarts.

You can also change the video refresh rate using the Refresh utility. The Refresh utility allows you to set the highest video refresh rate supported by your SVGA display. The highest refresh rate enables your computer to display the highest quality video. There are two ways to use the Refresh utility: graphical mode and command mode. Run the Refresh utility each time you turn on, or restart your computer. The easiest way to use the Refresh utility is to run the REFRESH command from your AUTOEXEC.BAT file. You can change the video refresh rate at any time from the DOS prompt with the Refresh utility. The refresh rate will be active until you use the Refresh utility again to or you restart your computer.

Refresh from AUTOEXEC.BAT

To automatically set the refresh rate each time you turn on, or restart your computer, run the Refresh utility from your AUTOEXEC.BAT. To do this, follow the steps below:

1. Insert the *DOS Drivers / Utilities* diskette in drive A.

2. Type:

```
COPY A:\UTIL\*.* C:\
```

and press **Enter**.

3. Edit your AUTOEXEC.BAT file and add the following line:

```
C:\REFRESH mode refresh_rate
```

Note: Select the *mode* and *refresh_rate* (for example, C:\REFRESH 1024 3) from the following tables:

Mode	
640	(640 x 480)
800	(800 x 600)
1024	(1024 x 768)
1280	(1280 x 1024)
1600	(1600 x 1200)

Refresh Rate	
0	(56Hz)
1	(60Hz)
2	(70Hz)
3	(72Hz)
4	(75Hz)
5	(Interlaced)

Refresh in Graphical Mode

If your computer has a mouse, and the mouse device driver is installed, the various refresh rates appear in a graphical screen when you run the Refresh utility. Use your mouse to select the highest refresh rate supported by your display. To determine which refresh rate to use, refer to the documentation that came with your display.

To run the Refresh utility:

1. Insert the *DOS Drivers / Utilities* diskette in drive A.
2. Type:
A:\UTIL\REFRESH
and then press **Enter**.
3. Use the mouse to select the refresh rate.
4. Click on **Exit** to save the changes and exit.

Refresh From the Command Line

If your computer does not have a mouse, the refresh rate can be set directly from the command line. To determine which refresh rate to use, refer to the documentation that came with your display.

To run the Refresh utility:

1. Insert the *DOS Drivers / Utilities* diskette in drive A.
2. Type:

A:\UTIL\REFRESH *mode refresh_rate*

and press **Enter**.

Note: Select the *mode* and *refresh_rate* (for example, A:\UTIL\REFRESH 1024 3) from the tables below:

Mode	
640	(640 x 480)
800	(800 x 600)
1024	(1024 x 768)
1280	(1280 x 1024)
1600	(1600 x 1200)

Refresh Rate	
0	(56Hz)
1	(60Hz)
2	(70Hz)
3	(72Hz)
4	(75Hz)
5	(Interlaced)

Microsoft Windows Version 3.1 Drivers

This section contains instructions for installing and updating the Microsoft Windows 3.1 driver and the system support instructions.

Note: These instructions assume that the Microsoft Windows program is located on your C drive in the \WINDOWS directory.

Installation

1. Exit the Windows program.
2. Change to the Windows directory by typing **CD\WINDOWS** and then press **Enter**.
3. Type **SETUP** and then press **Enter**.
4. You see a screen that shows the current Windows configuration. Move the highlighted selection bar to the **Display** entry and then press **Enter**.
5. You see a screen that lists display adapters that you might select for use with the Windows program. Move the highlight bar down to the entry marked: **Other (Requires disk provided by a hardware manufacturer)** and then press **Enter**.
6. Insert the *S3 Vision864 Windows Drivers* diskette in drive A and then press **Enter**.
7. Select the desired screen resolution. The resolution must be supported by your display (refer to the documentation supplied with your display for specifications).
8. Press **Enter** to "Complete Changes."
9. Press **Esc** to install the new driver. You might be prompted to insert a diskette. If this happens, type **A:** and then press **Enter**. Setup will copy files from the diskette into your Windows directories.
10. When Setup is complete, you are returned to the DOS prompt. Type **WIN** and then press **Enter** to start the Windows program.

Updating the Device Drivers

1. Before updating the drivers, use Windows Setup to select the VGA or SUPERVGA video driver. Selecting the video driver beforehand prevents the installation program from overwriting the driver that Windows uses to control your screen.
2. Next go to the WINDOWS\SYSTEM directory and find a file that is named 'OEM?.INF' where the question mark is a number. There may be more than one. These are the different OEMSETUP.INF files that have been used to configure Windows for different devices.
3. Use File Manager to locate the previous versions of the S3 video driver and delete the old version of the driver.

If you do not delete the old files, the drop down box for Setup becomes very cluttered with different versions of the same files.

Pixel Resolution	Colors	Video Memory Required	Font Size
640 x 480	256	1024K	Fixed
640 x 480	32768	1024K	Fixed
640 x 480	65536	1024K	Fixed
640 x 480	16777216	1024K	Fixed
800 x 600	16	1024K	Large/Small
800 x 600	256	1024K	Large/Small
800 x 600	32768	2048K	Large/Small
800 x 600	65536	2048K	Large/Small
800 x 600	16777216	2048K	Large/Small
1024 x 768	16	1024K	Large/Small
1024 x 768	256	1024K	Large/Small
1024 x 768	32768	2048K	Large/Small
1024 x 768	65536	2048K	Large/Small
1152 x 864	256	1024K	Large/Small
1280 x 1024	16	1024K	Large/Small
1280 x 1024	256	2048K	Large/Small
1600 x 1200	256	2048K	Large/Small

DOS Drivers / Utilities

This section contains the driver installation instructions and applicable usage and performance tips for the following DOS applications:

- DataCAD 4.06
- CADVANCE 3.51
- Generic CADD 6.0
- AutoDesk ADI Version 4.2 (Protected mode only)
- Microstation PC (Protected Mode 4.0 and 5.0)
- Lotus 1-2-3 Version 2.3
- Microsoft Word Version 5.0

DataCAD Version 4.06 Installation

This driver is terminate-and-stay-resident (TSR) program that must be loaded *BEFORE* the DataCAD program will run. The driver will accept command-line options that will change the behavior of the driver.

Note: These instructions assume that the DataCAD program is located on your C drive in the \MTEC directory.

1. Insert the *DOS Drivers / Utilities* diskette in drive A.
2. Change to the DataCAD directory by typing **CD\MTEC** and then press **Enter**.
3. Copy the CADKEY driver from the diskette into the DataCAD directory.

With EMS Memory type:

```
COPY A:\CADKEY\DL_911.EXE C:\MTEC\DRV
```

and then press **Enter**.

Change to the driver directory. Type **CD\MTEC\DRV** and then press **Enter**.

Backup and create a new, appended, DRIVERS.GD4 file. Type:

```
REN DRIVERS.GD4 DRIVERS4.BAK
```

and then press **Enter**.

Note: If DRIVERS4.BAK already exists, delete it and repeat this step.

Then type:

```
COPY DRIVERS4.BAK+A:\CADKEY\DRIVERS.GD4 DRIVERS.GD4
```

and then press **Enter**.

Without EMS Memory type:

```
COPY A:\CADKEY\CK_911.EXE C:\MTEC\DRV
```

and then press **Enter**.

Change to the driver directory. Type **CD\MTEC\DRV** and then press **Enter**.

Backup and create a new, appended, DRIVERS.GD2 file. Type:

```
REN DRIVERS.GD2 DRIVERS2.BAK
```

and then press **Enter**.

Note: If DRIVERS2.BAK already exists, delete it and repeat this step.

Then type:

```
COPY DRIVERS2.BAK+A:\CADKEY\DRIVERS.GD2 DRIVERS.GD2
```

and then press **Enter**.

4. Type **CD\MTEC** and then press **Enter**.

5. Configure DataCAD. Type **CONFIG** and then press **Enter**.

Then:

- a. Select **Display device options**.
- b. Select **Display device**.
- c. Select **S3 86C911**.
- d. Select **Screen resolution**.
- e. Select the appropriate graphics mode for your display.
- f. Select any additional options, depending on your preferences, and exit saving the new configuration.

CADVANCE Version 3.51 Installation

This driver is loaded into memory by the CADVANCE program and requires no intervention on your part. The CADVANCE program also removes the driver from memory upon completion, thus conserving DOS memory.

Note: These instructions assume that the CADVANCE program is located on your C drive in the \CADVANCE directory.

To install the driver:

1. Insert the *DOS Drivers / Utilities* diskette in drive A.
2. Change to the CADVANCE directory by typing **CD\CADVANCE** and then press **Enter**.
3. Copy the CADVANCE driver from the diskette into the CADVANCE directory.
Type:

```
COPY A:\CADVANCE\CDV911.DRV C:\CADVANCE\GS.DRV
```

and then press **Enter**.

Before starting the application, you need to set an environment variable as follows:

```
SET S31_911=<MODE>
```

Where <MODE> is:

- 0 640 x 480, 256 colors
- 1 -->reserved<--
- 2 800 x 600, 256 colors
- 3 -->reserved<--
- 4 1024 x 768, 256 colors
- 5 -->reserved<--
- 6 -->reserved<--
- 7 -->reserved<--
- 8 -->reserved<--

All resolution modes may not be available on your computer. Refer to the documentation that came with your display for additional information.

Generic CADD Version 6.0 Installation

Note: These instructions assume that the Generic CADD program is located on your C drive.

To install the driver:

1. Insert the *DOS Drivers / Utilities* diskette in drive A.
2. Change the current drive/directory path to the one that contains the Generic CADD 6.0.
3. Copy the drivers from the \GENCAD subdirectory on the driver disk to the subdirectory that contains the application. Type:

```
COPY A:\GENCAD\LGEN6S3.VGD C:
```

and then press **Enter**.

Type:

```
COPY A:\GENCAD\SGEN6S3.VGD C:
```

and then press **Enter**.

4. After the drivers are copied into the appropriate directory, run the CONFIG, to configure the application.

- Follow the instructions on the screen to configure video graphics display.
- Select the **Other VGD file(s)** option.
- Press **Enter** to select **Enter Path for VGD files**
- Select LGEN6S3 or SGEN6S3.

Note: LGEN6S3 is faster than SGEN6S3, but uses more memory. If you do not have enough memory, use SGEN6S3.

- Press **Esc** to save the changes and exit to DOS
- Type **Y** to keep the changes.
- Continue to follow the instructions on the screen. Refer to the Generic CADD program documentation for additional information.

Before starting the application, you need to set an environment variable as follows:

```
SET CADD_INIT=n
```

where n is:

```
0 = 640x480x256 colors
```

```
2 = 800x600x256
```

```
4 = 1024x768x256
```

AutoDesk ADI Version 4.2 Installation

The Aquila driver is a professional-quality PADI (Protected mode AutoDesk Driver Interface) combined display and rendering device driver to be used with AutoCAD Release 11/12, 3D Studio** Version 1.0/2.0, and AutoShade** Version 2.1 programs.

Features

- Protected mode operation, PADI Version 4.2 specification.
- 32-bit display list for "no regen" operation.
- Display list operation with 16 active viewports, including paperspace viewports.
- Birds-Eye and Edge-Pan features for convenient zooms and pans.
- Partial redraws on overlapping viewports.
- Redraw list for maximum redraw speed with Release 11.
- Intelligent clean-up (Erase Buffer) to eliminate "flashing".
- Display list memory meter.
- AutoCAD memory usage statistics.
- Paging Alarm** function disables display list usage when paging becomes excessive.
- Reliable dual-screen operation.
- Variable font support: allows fonts up to 16x30 in size.
- International font support.
- User-configurable screen colors.
- High-color mode Band-Free** Rendering support.
- 24- and 32-bit Rendering support.
- Text screen emulation window for Release 12.

To install the driver:

1. Insert the *DOS Drivers / Utilities* diskette in drive A.
2. Create a directory on your hard disk drive for these files. Type:

```
MD C:\AQUILA
```

and then press **Enter**.
3. Type **CD\AQUILA** and then press **Enter**.
4. Copy the ADI files from the *DOS Drivers / Utilities* diskette to this directory. Type:

```
COPY A:\ADI42\*.* C:
```

and then press **Enter**.
5. Type **CD** and then press **Enter**.
6. Edit the AUTOEXEC.BAT file and add the following three lines:

```
SET DSPADI=C:\AQUILA\RCP_S3.EXP  
SET RCPADI=%DSPADI%  
SET RDPADI=%DSPADI%
```

To activate these drivers, restart your system. Refer to your Autodesk *Installation and Performance Guide* for additional SET commands.

The Aquila driver will detect the AutoDesk application that is being configured for and will provide correct defaults for all the various applications. Accepting all the default parameters, your driver will be configured correctly. This will work with AutoCAD, AutoShade or 3D Studio.

AutoCAD Release 11 Configuration

To configure:

1. Before you update your AUTOEXEC.BAT file, ensure that the Aquila driver is installed, see "AutoDesk ADI Version 4.2 Installation" on page E-13.
2. Edit the AUTOEXEC.BAT file and add the following line:

```
SET AQUILA_FONT=C:\AQUILA\filename
```

Note: Select a *filename* (for example, 9X15.FNT) from the table below.

Font	Resolution	File Name
VGA	640x480	N/A
8x16	640x480	8X16.FNT
9x15	800x600	9X15.FNT
12x20	1024x768	12X20.FNT
15x25	1280x1024	15X25.FNT
15x30	1600x1200	16X30.FNT

3. Restart your system to activate the changes.
4. Change the current drive/directory to the one that contains the AutoCAD Release 11 program.
5. Start the AutoCAD program by typing **ACAD** and then press **Enter**.
Note: If AutoCAD is already configured, continue with step 6. If you are configuring AutoCAD for the first time, go to step 9.
6. Select option #5, **Configure AutoCAD**.
7. Select option #3, **Configure video display**.
8. Type **Y** and then press **Enter**.
9. Select option #1, **ADI P386 v4.0/4.1 display**.
10. Select option #1, **Display mode: undefined single screen mode**.
11. Select the desired resolution mode.
12. If you have a monochrome card in your system, and wish to operate in dual screen mode, answer **Yes** to **Enable Dual Screen Mode** question. Otherwise answer **No**.
13. Select option #0 to exit the **AutoCAD configuration options** screen and accept the option's defaults. Information on customizing these options is in the README file located in the ADI42 directory on the *DOS Drivers / Utilities* diskette.
14. Select any additional configuration options, depending upon your preferences.
15. Exit, saving the new configuration. Refer to the AutoCAD documentation for additional information.

AutoCAD Release 12 Configuration

To configure:

1. Ensure that the Aquila driver is installed, see "AutoDesk ADI Version 4.2 Installation" on page E-13.
2. Edit the AUTOEXEC.BAT file and add the following two lines:

```
SET ACADDRV=C:\AQUILA;C:\ACAD\DRV  
SET AQUILA_FONT=C:\AQUILA\filename
```

Note: Select a *filename* (for example, 9X15.FNT) from the table below.

Font	Resolution	File Name
VGA	640 x 480	N/A
8 x 16	640 x 480	8X16.FNT
9 x 15	800 x 600	9X15.FNT
12 x 20	1024 x 768	12X20.FNT
15 x 25	1280 x 1024	15X25.FNT
15 x 30	1600 x 1200	16X30.FNT

3. Restart your system to activate the changes.
4. Change to the directory containing the AutoCAD Release 12 program, type **ACAD** and then press **Enter**.
Note: If AutoCAD is already configured, type **ACAD -R** and then press **Enter**.
5. Select **Configure video display**.
6. Select **S3 ADI 4.2 Display/Rendering V1.92Build7 by ATC Graphics**.
7. Select option #1, **Display mode: undefined single screen mode**.
8. Select the desired resolution mode.
9. If you have a monochrome card in your system, and wish to operate in dual screen mode, answer **Yes** to **Enable Dual Screen Mode** question. Otherwise answer **No**.
10. Select option #0 to exit the **AutoCAD configuration options** screen and accept the option's defaults. Information on customizing options is in the README file located in the ADI42 directory on the *DOS Drivers / Utilities* diskette.
11. Complete the AutoCAD configuration. Refer to the AutoCAD documentation for additional information.

AutoCAD 12 AVE Configuration: AutoCAD's AVE Rendering must also be configured for the Aquila driver.

1. If you are reconfiguring AutoCAD, delete your current AVE.CFG file.
2. Once in AutoCAD, type **RCONFIG** at the AutoCAD command prompt, or select from the pulldown menus, **RENDER/PREFERENCES\Reconfigure**.
3. When you configure the rendering driver for AutoCAD Render, select option 1, AutoCAD's configured P386 combined display/rendering driver. (Do not select option 2)
4. Select S3 Rendering resolution you want from the menu list of available resolutions supported by your system. Your selection must be compatible with any limitations related to your current AutoCAD display configuration.
 - All resolutions listed will work when rendering to a full-screen with a single monitor system.
 - With a dual-monitor configuration, select rendering to a viewpoint (currently AutoCAD 12c2 does not return properly from rendering to a separate screen).
 - If you plan to render to a 256-color viewpoint, select the same resolution for your renderings. When rendering to a viewpoint, AutoCAD's display driver controls the rendering resolution.
5. Select whether you wish to render to a viewpoint or a full screen.
6. Configure any hardcopy device as needed.
7. Exit the configuration and save your changes.

AutoShade Version 2.1 Configuration

To configure:

1. Ensure that the Aquila driver is installed, see "AutoDesk ADI Version 4.2 Installation" on page E-13.
2. Edit the AUTOEXEC.BAT file and add the following line:

```
SET AQUILA_FONT=C:\AQUILA\filename
```

Note: Select a *filename* (for example, 9X15.FNT) from the table below.

Font	Resolution	File Name
VGA	640 x 480	N/A
8 x 16	640 x 480	8X16.FNT
9 x 15	800 x 600	9X15.FNT
12 x 20	1024 x 768	12X20.FNT
15 x 25	1280 x 1024	15X25.FNT
15 x 30	1600 x 1200	16X30.FNT

3. Restart your system to activate the changes.
4. Change to the directory containing the AutoShade 2.1 program, type:
SHADE /R
and then press **Enter**.
5. Select the correct pointing device.
6. Select option #2, **P386 Autodesk Device Interface display driver**.
7. Select option #1, **Display mode: undefined**.
8. Select the desired resolution mode.
9. Select option #2, **Menu colors** and select your preferences.
10. Save and exit the colors menu when finished selecting colors.
11. Select option #0, **Exit**.
12. Select option #2, **P386 AutoDesk Device Interface rendering driver**.
13. Select a resolution mode for the rendering (Shading and RenderMan**) screen. If you select the 32K or 64K color mode, you will be asked if you wish to enable Band-Free mode, which allows the best color quality possible in a high-color mode. Select **Low, Medium, or High**.
14. Answer the next three questions with **YES**, since only one screen is used, and must be redrawn upon switching.
15. Select a hard copy device option.
16. Configuration is now complete and the AutoShade main screen appears.

3D Studio Version 1.0 Configuration

To configure:

1. Ensure that the Aquila driver is installed, see "AutoDesk ADI Version 4.2 Installation" on page E-13.
2. Change to the directory containing the 3D Studio 1.0 program, and edit the 3DS.SET file to make the following changes.

- Locate the line that begins with:

```
DEFAULT-DISPLAY = "VGA320X200"
```

and change it to:

```
DEFAULT-DISPLAY = "RCPADI"
```

- Locate the line that begins with:

```
;MAIN-DISPLAY = RCPADI
```

and remove the semicolon (;).

- Locate the line that begins with:

```
;MATERIAL-DISPLAY = RCPADI
```

and remove the semicolon (;).

- Save the file and exit the editor.

3. Delete the file 3DADI.CFG, if present.
4. Type **3DS** and then press **Enter**.
5. Select option #1, **Display mode: undefined**.
6. Select a resolution mode from the options. The main display mode will be used for the 2D Shaper, 3D Loftter, 3D Editor, and Keyframer.
7. Select option #0, **Exit**.
8. Select option #1, **Display mode: undefined**.
9. Select a desired resolution.

Note: Use of a resolution greater than 640x480 will not increase the usefulness of the Materials Editor.

10. Select option #0, **Exit**.

You should now be inside the 3D Editor of the 3D Studio program.

Note: The first time you try to render a drawing, or view an image, you will be asked to configure the Rendering device and to select a resolution for Rendering. If you select the 32K or 64K color mode, you will be asked if you wish to enable Band-Free mode. This allows the best color quality possible in a high-color mode. Select **Low, Medium or High**. Configuration is now complete.

3D Studio Version 2.0 Configuration

To configure:

1. Ensure that the Aquila driver is installed, see "AutoDesk ADI Version 4.2 Installation" on page E-13.
2. Change to the directory containing the 3D Studio 2.0 program, and edit the 3DS.SET file to make the following changes:
 - a. Locate the line that begins with
`RENDER-DISPLAY = VGA320X200`
and change it to:
`RENDER-DISPLAY = RCPADI`
 - b. Locate the line that begins with:
`;MAIN-DISPLAY = RCPADI`
and remove the semicolon (;).
 - c. Locate the line that begins with:
`;MATERIAL-DISPLAY = RCPADI`
and remove the semicolon (;).
 - d. Save the file and exit the editor.
3. Delete the file 3DADI.CFG, if present.
4. Type **3DS** and then press **Enter**.
5. Type **Y** and then press **Enter**.
6. Select option #1, **Display mode: undefined**.
7. Select a resolution mode from the options. The main display mode will be used for the 2D Shaper, 3D Loftter, 3D Editor, and Keyframer.
8. Select option #0, **Exit**.
9. Select option #1, **Display mode: undefined**.
10. Select a resolution for the **ADI MEDIT, Materials Editor**.
Note: Use of a resolution greater than 640x480 will not increase the usefulness of the Materials Editor.
11. Select option #0, **Exit**.
12. **Will RDPADI render to a separate screen?** Type **N** and then press **Enter**.
13. Select a resolution mode for the Rendering "RDPADI" Device. If you select the 32K or 64K color mode you will be asked if you wish to enable Band-Free mode. This allows the best color quality possible in a high-color mode. Select **Low, Medium, or High**.
14. **Will RCPADI render to a separate screen?** Type **N** and then press **Enter**.
15. Select the same mode that was used for RDPADI in step 13.
16. Configuration is now complete.

MicroStation PC (Protected Mode) Version 4.0 Installation

Note: These instructions assume that the MicroStation PC program is located on your C drive in the \USTAT40 directory.

To install the driver:

1. Insert the *DOS Drivers / Utilities* diskette in drive A.
2. Change to the MicroStation PC drivers directory by typing **CD\USTAT40\DRIVERS** and then press **Enter**.
3. Type:
COPY A:\PMUSTAT4*. * C:
and then press **Enter**.
4. Return to the USTAT40 directory by typing **CD..** and then press **Enter**.
5. To select the new device driver, type **USCONFIG** and then press **Enter**.

Then:

- a. Select **DISPLAY ADAPTERS**.
- b. Select **VENDOR SUPPLIED DRIVER**.
- c. Select **PMGL4S3 V1.09 for S3 Accelerators**.
- d. Select **NO SECOND ADAPTER**
- e. Select **SWAP SCREEN STATUS Y or N**
- f. Select **Exit and Save**.

These drivers will be active the next time you start the MicroStation PC program.

Note: The next time that you start the MicroStation PC program, you will be asked to select your video resolution. Ensure that the resolution you select is compatible with your display. If you want a different resolution at a later time, you must delete the MGL4S3.CFG file in the C:\USTAT40\DRIVERS subdirectory.

MicroStation PC (Protected Mode) Version 5.0 Installation

Note: These instructions assume that the MicroStation PC program is located on your C drive in the \USTAT50 directory.

To install the driver:

1. Insert the *DOS Drivers / Utilities* diskette in drive A.
2. Change to the MicroStation PC drivers directory by typing **CD\USTAT50\DRIVERS** and then press **Enter**.
3. Type:
COPY A:\PMUSTAT5*. * C:
and then press **Enter**.
4. Return to the USTAT50 directory by typing **CD..** and then press **Enter**.
5. To select the new device driver, type **USCONFIG** and then press **Enter**.

Then:

- a. Select **DOS**
- b. Select **DISPLAY ADAPTERS**.
- c. Select **MGL5S3 V1.01 for S3 Accelerators**.
- d. Select **NO SECOND ADAPTER**
- e. Select **SWAP SCREEN STATUS Y or N**
- f. Select **Exit and Save**.

These drivers will be active the next time you start the MicroStation PC program.

Note: The next time that you start the MicroStation PC program, you will be asked to select your video resolution. Ensure that the resolution you select is compatible with your display. If you want a different resolution at a later time, you must delete the MGL5S3.CFG file in the C:\USTAT50\DRIVERS subdirectory.

LOTUS 1-2-3 Version 2.3 Installation

Note: These instructions assume that the Lotus 1-2-3 program is located on your C drive in the \123 directory.

To install the driver:

1. Insert the *DOS Drivers / Utilities* diskette in drive A.
2. Change to the Lotus 1-2-3 directory by typing **CD\123** and then press **Enter**.
3. Copy the Lotus 1-2-3 drivers from the diskette to the Lotus 1-2-3 directory.
Type:

```
COPY A:\LOTUS\*.* C:
```

and then press **Enter**.

4. Type **INSTALL** and then press **Enter** to run the Lotus 1-2-3 install program.
5. Press **Enter** to continue.

You will be presented with several menu choices. Follow the directions on the screen and perform the following steps:

- a. Select **Change Selected Equipment**.
- b. Select **Modify the Current Driver Set**.
- c. Select **Text Display**.
- d. Select the desired S3 text display driver.
- e. Select **Graphics Display**.
- f. Select the desired S3 graphics display driver.

Note: Do not select the drivers for dual display. This configuration is not supported.

- g. Press **Esc** to return to previous menu.
- h. Select **Save the Current Drive Set**.
- i. Press **Enter** twice to continue.
- j. Select **End Install**.

Microsoft Word Version 5.0 Installation

Note: These instructions assume that the Microsoft Word 5.0 program is located on your C drive in the \WORD5 directory.

To install the driver:

1. Insert the *DOS Drivers / Utilities* diskette in drive A.
2. Change to the Microsoft Word directory by typing **CD\WORD5** and then press **Enter**.
3. Save a copy of the SCREEN.VID file. Type:

```
REN SCREEN.VID SCREEN.BAK
```

and then press **Enter**.
4. Copy the drivers from the diskette to the WORD5 directory. Type:

```
COPY A:\MSWORD\*. * C:
```

and then press **Enter**.
5. Run the Microsoft Word program.
6. The Word program uses several different display resolutions and character sizes to offer a wide variety of visible characters. Several new modes are now available for use, and you can select from a list by pressing **Esc** then select **O** (for Options.), and then moving to the **DISPLAY MODE** entry with the **Arrow** keys. Press **F1** to display all of the available resolution choices. If necessary, press **Down** to display more resolution choices. The new graphics modes are the entries for 37, 38, 42, 48, 54, 75, and 96 lines. The new text modes are the 25 and 43 lines (132 columns). Select the resolution by moving the highlight and then press **Enter**.
7. After display option is selected, the Word program will use the new resolution.

Index

A

adapters 1-9
address conflicts 5-9

B

battery failure error message 5-14
bays, drive 1-9
bezel, drive 1-10
blank screen 5-7
broken cover lock 5-8

C

cable
 chaining drives with 1-11
 external drive 1-11
 internal drive 1-10
 lengths 1-11
 SCSI 1-10, 1-11
 terminators (SCSI) 1-11
cache memory 1-9
cache memory modules 8-9
cache memory, installing 3-8
CD-ROM drive 1-9
CD-ROM drives 8-8
chaining, drive 1-11
changing jumpers C-1
character tests 6-22
configuration
 device change 5-14
 hardware change 5-13
 memory change 5-15
Configuration Utility program, description 5-3
conflicts, eliminating assignment 5-9
cover lock, broken 5-8
creating the error log 6-23

D

detecting POST errors 5-2, 5-4
device configuration error 5-14
device drivers E-1
device records A-1
diagnostic
 diskette 5-1
 error messages 5-3, 5-17
 tools 5-2
Diagnostics Diskette 6-17
dimensions B-1
direct memory access (DMA) channel
 assignments D-2

disk drive, hard 1-9
diskette
 PS/ValuePoint Diagnostics Type 5 diskette 5-1
diskette change test 6-20
diskette drive 1-9
diskette drive in-use lights 5-6
diskette write-protect jumper (WRITE PROTECT) C-2
display
 blank screen 5-7
 distorted screen 5-7
 error codes 5-4, 5-11
 jitter 5-7
 problems 5-7, 5-11
 rolling screen 5-7
 self-tests 5-6
 wavy screen 5-7
display attributes 6-22
display the error log 6-23
displays 1-14
drive
 cables 1-10
 chaining 1-11
 cover plates 1-10
 external 1-9
 IDE 1-10
 installation hardware 1-10
 installing internal 3-12
 internal 1-9
 SCSI 1-10
 sizes 1-9

E

error detection and correction 6-21
error log
 creating the 6-23
 display the 6-23
errors
 battery failure 5-14
 device configuration 5-14
 diagnostic 5-13, 5-17
 memory configuration 5-15
 messages 5-3, 5-11, 5-13
 POST 5-13
 prompt 5-11
 software 5-12
expansion slots 1-9

F

fan (power supply) problems 5-8

fixed disk drive 1-9
formatting procedure 6-21
front access door 4-1
FRU Numbers 8-1

G

general problems 5-8
graphic tests 6-22

H

handling static-sensitive devices 1
hard disk drive 1-9, 8-7
 bad sector 5-11
 testing 5-11
hard disk drive menu 6-20
hardware
 diagnostic error messages 5-17
 problems 5-1
 testing programs 5-1
head select 6-21

I

icon 6-17
ID, SCSI 1-10
IDE controller 1-10
in-use lights 5-6
indicator lights problem 5-8
industry-standard architecture (ISA)-bus adapters D-1
installation hardware, drive 1-10
installation problems
 options 5-9
 power-on 5-10
installing options 3-1
intermittent problems 5-8
internal drive cables 1-10
interrupt conflicts 5-9
interrupt request assignments D-1

K

keyboard 1-13
keyboard problems 5-9
kits, installing cache memory module 3-8
kits, installing RAM memory module 3-6
kits, installing video memory module 3-10

L

LEDs 4-1
light pen connector 1-13
lights not working 5-8
lock for cover, broken 5-8

M

memory 1-9
memory configuration error 5-15
memory modules 8-9
messages
 battery failure error 5-14
 device configuration error 5-14
 diagnostic error 5-3, 5-13, 5-17
 error 5-13
 memory configuration error 5-15
 POST error 5-3, 5-13
 screen 5-11
 software-generated error 5-3
microprocessor 1-9
microprocessor-SL jumper
 (SL-ENHANCED NON-SL) C-2
microprocessor-upgrade jumper
 (DX/DX2/DX4 486SX) C-2
modem connector 1-13
mouse connector 1-13
mouse problems 5-9
mouse-disable jumper (IRQ12) C-2

O

occasional problems 5-8
on/off switch 4-1
options 1-9
options problems 5-9

P

parallel devices 1-13
parts 8-1
parts warranty 8-1
password prompt 5-11
password, power-on 5-4, 5-9
physical dimensions B-1
plates, cover 1-10
pointing devices 1-13
pointing-device problems 5-9
port assignment conflicts 5-9
POST 6-17
 See also power-on self-test (POST)
power management function 4-7
power supply fan problems 5-8
power switch 4-1
power-on password 5-4, 5-9
power-on problems 5-4, 5-10
power-on self test 6-17
power-on self-test (POST)
 battery failure error 5-14
 description 5-2
 error detection 5-2, 5-4
 error messages 5-3, 5-13
 operation 5-2, 5-4

- printer problems 5-11
- printers, SCSI 1-10
- problems
 - diskette 5-6
 - diskette drive 5-6
 - display 5-7
 - error prompt 5-11
 - fan 5-8
 - forgotten power-on password 5-9
 - hardware 5-1
 - intermittent 5-8
 - keyboard 5-9
 - mouse 5-9
 - no beep 5-7
 - occasional 5-8
 - only cursor appears 5-8
 - options 5-9
 - overview 5-1
 - password prompt 5-11
 - pointing-device 5-9
 - power-on 5-4, 5-10
 - printer 5-11
 - screen distortion 5-7
 - screen jitter 5-7
 - screen roll 5-7
 - software 5-1, 5-12
 - solving 5-4
 - user error 5-1
 - wrong number of beeps 5-7
 - wrong screen characters 5-8
- program
 - Configuration Utility 5-3
 - diagnostic 5-3, 5-5
 - power-on self-test (POST) 5-2
- prompt
 - error 5-11
 - password 5-11

R

- rails, drive 1-10
- RAM 1-9
- read verify 6-21
- records, device A-1
- replacement parts 8-1
- riser-select jumpers (VESA PCI) C-2

S

- scanners, SCSI 1-10
- screen
 - blank 5-7
 - Diagnostics diskette Main Menu 5-5
 - messages 5-11
 - screen paging 6-22

- SCSI 1-11
 - chaining drives 1-11
 - terminators 1-11
- seek test 6-20, 6-21
- self-tests, internal 5-2, 5-4
- serial devices 1-13
- service parts warranty 8-1
- SIMMs 8-9
- SIMMs, installing 3-6
- sizes, drive 1-9
- slide, drive 1-10
- software
 - errors 5-12
 - problems 5-1, 5-4
 - specifications 1-7
- speed test 6-20
- starting the
 - computer 5-4
 - diagnostic programs 5-5
- static-sensitive devices, handling 1
- SVGA device drivers E-1
- switch, on/off 4-1
- switch, power 4-1
- switch, voltage-selection 5-4
- sync test 6-22
- system board 8-9
- system memory combinations 3-6

T

- terminators 1-11
- test programs, hardware 5-1
- test the system program
 - description 5-3
 - files location 5-5
 - running 5-5
- testing the
 - character 6-22
 - computer 5-4, 5-5
 - diskette change 6-20
 - display 5-6
 - error detection and correction 6-21
 - graphics 6-22
 - read verify 6-21
 - screen paging 6-22
 - seek 6-21
 - speed 6-20
 - verify diskette 6-20
 - VGA 6-22
 - write, read, compare 6-20
- tools, diagnostic 5-2
- trackball connector 1-13
- tray, drive 1-10
- troubleshooting charts
 - description 5-3
 - diskette drive 5-6

troubleshooting charts (*continued*)

- display 5-7
- forgotten power-on password 5-9
- general problems 5-8
- intermittent problems 5-8
- keyboard 5-9
- mouse 5-9
- options 5-9
- pointing-device 5-9
- power-on 5-10
- printer 5-11
- screen messages 5-11
- software 5-12
- using 5-6

U

- user error problems 5-1

V

- verify diskette test 6-20
- VGA test 6-22
- video graphics array menu 6-22
- video memory 1-9
- video memory modules 8-9
- video memory, installing 3-10
- video-adaptor jumper (ENABLE DISABLE) C-2
- voltage-selection switch 5-4

W

- warranty service parts 8-1
- WRITE PROTECT (diskette write-protect) jumper C-2
- write, read, compare (on test cylinder) 6-21
- write, read, compare test 6-20

Readers' Comments — We'd Like to Hear from You

7585 Industrial Computer Information:

Installation

Operation

Hardware Maintenance

Publication No. S06H-2298-00

Overall, how satisfied are you with the information in this book?

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Overall satisfaction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How satisfied are you that the information in this book is:

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Accurate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Complete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to understand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Well organized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Applicable to your tasks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please tell us how we can improve this book:

Thank you for your responses. May we contact you? Yes No

When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you.

Name

Address

Company or Organization

Phone No.



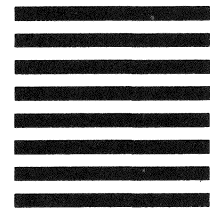
Fold and Tape

Please do not staple

Fold and Tape



NO POSTAGE
NECESSARY
IF MAILED IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 40 ARMONK, NEW YORK

POSTAGE WILL BE PAID BY ADDRESSEE

International Business Machines Corporation
Information Development
Department 27X
PO BOX 1328
BOCA RATON FL 33429-1328



Fold and Tape

Please do not staple

Fold and Tape

Readers' Comments — We'd Like to Hear from You

7585 Industrial Computer Information:
Installation
Operation
Hardware Maintenance

Publication No. S06H-2298-00

Overall, how satisfied are you with the information in this book?

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Overall satisfaction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How satisfied are you that the information in this book is:

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Accurate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Complete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to understand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Well organized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Applicable to your tasks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please tell us how we can improve this book:

Thank you for your responses. May we contact you? Yes No

When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you.

Name

Address

Company or Organization

Phone No.



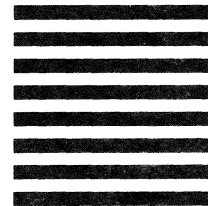
Fold and Tape

Please do not staple

Fold and Tape



NO POSTAGE
NECESSARY
IF MAILED IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 40 ARMONK, NEW YORK

POSTAGE WILL BE PAID BY ADDRESSEE

International Business Machines Corporation
Information Development
Department 27X
PO BOX 1328
BOCA RATON FL 33429-1328



Fold and Tape

Please do not staple

Fold and Tape

Readers' Comments — We'd Like to Hear from You

7585 Industrial Computer Information:

Installation

Operation

Hardware Maintenance

Publication No. S06H-2298-00

Overall, how satisfied are you with the information in this book?

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Overall satisfaction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How satisfied are you that the information in this book is:

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Accurate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Complete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to find	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to understand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Well organized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Applicable to your tasks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please tell us how we can improve this book:

Thank you for your responses. May we contact you? Yes No

When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you.

Name

Address

Company or Organization

Phone No.



Cut or Fold
Along Line

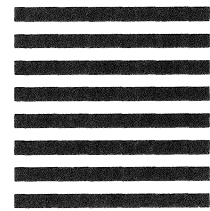
Fold and Tape

Please do not staple

Fold and Tape



NO POSTAGE
NECESSARY
IF MAILED IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 40 ARMONK, NEW YORK

POSTAGE WILL BE PAID BY ADDRESSEE

International Business Machines Corporation
Information Development
Department 27X
PO BOX 1328
BOCA RATON FL 33429-1328



Fold and Tape

Please do not staple

Fold and Tape

Cut or Fold
Along Line



IBM 7585 Industrial Computer Information:
Installation
Operation
Hardware Maintenance

TNL SN28-9752-00

Technical Newsletter

Base Publication Number: S06H-2298-00

Date: 2 November 1994

Previous Newsletters: None

This Technical Newsletter provides replacement pages and additional information for the subject manual. The replacement pages and additional information remain in effect for subsequent editions unless specifically altered. Pages to be inserted or replaced are:

vii to xiv	4-1 to 4-50
(Contents) Part 1. User Information	5-3 to 5-4
2-9 to 2-12	8-9 to 8-10
3-11 to 3-14	X-1 to X-4

A change to the text is indicated by a vertical line to the left of the change. Absence of a vertical line on a page bearing an "Updated" notice means only that previously existing text has been moved or rearranged.

Summary of Amendments

This Technical Newsletter contains revisions to text and graphics from the subject manual.

Note: Please file this cover letter at the back of the manual to provide a record of changes.

Comments on this Technical Newsletter can be addressed to:

IBM Corporation
Information Development
Department 27X
P.O. BOX 1328
BOCA RATON FL 33429-1328

IBM Internal Use Only

SN28-9752-00 © Copyright IBM Corp. 1994.

All rights reserved.

Note to US Government Users – Documentation related to restricted rights – Use, duplication or disclosure is subject to restrictions set forth in GSA ADP Schedule Contract with IBM Corp.

Contents

IBM System Programs License Agreement	iii
Statement of Limited Warranty (Machine)	v
Notices	xv
Power Cord	xv
Internal Fuse	xv
Trademarks and Service Marks	xvi
Required Electronic Emission and Connectivity Notices	xvii
Class A Federal Communications Commission Statement	xvii
Canadian Department of Communications Compliance Statement	xvii
United Kingdom	xviii
Germany	xviii
Japan	xviii
Korea	xix
Safety	xx
Caution Statements	xx
Varoitukset	xxii
Hinweise ACHTUNG	xxiv
Disposizioni per la sicurezza	xxvi
Instructies "Let op !"	xxviii
Säkerhetsinformation	xxx
Informações Sobre Segurança	xxxii
Instruções de Segurança	xxxiv
Consignes de sécurité électrique	xxxvi
Sikkerhedsforskrifter mærket 'Pas på!'	xxxviii
Advarsler	xl
Avisos de Precaución	xlii
Consignes de sécurité électrique	xliv
Lithium Battery Notice	xlvii
Handling Static-Sensitive Devices	I
Preface	li
Related Publications	lii

Part 1. User Information

Chapter 1. Overview of the 7585 Industrial Computer	1-1
General Description of Features	1-1
General Layout of Components	1-2
System Board Features	1-6
Specifications	1-7
Physical	1-7
Power Supply	1-7
Heat Output	1-7
Environment	1-7
Option Overview	1-9
RAM Memory	1-9
Cache Memory	1-9
Video Memory	1-9

Microprocessor	1-9
Adapters	1-9
Drives	1-9
Drive Sizes and Mountings	1-10
Cover Plates (Bezels)	1-10
Cables	1-10
Integrated Drive Electronics (IDE) Controller	1-10
Small Computer System Interface (SCSI) Drives	1-10
Keyboard	1-13
Pointing Devices	1-13
Parallel Devices	1-13
Serial Devices	1-13
Displays	1-14
Chapter 2. Installing Your Computer	2-1
Before You Begin:	2-1
Step 1. Unpack Your Computer	2-1
Step 2. Check the Voltage Setting	2-2
Step 3. Install Internal Options	2-3
Step 4. Mount the Computer	2-4
Free-Standing	2-4
Rack-Mount Setup with Slide Rails	2-5
Rack-Mount Setup without Slide Rails	2-6
Step 5. Connect the Cables	2-7
Step 6. Power-Up the Computer System and Check It Out	2-8
Step 7. Run the Configuration Utility	2-9
Updating the Computer Configuration Information	2-9
Step 8. Finish the Installation	2-11
Chapter 3. Installing Options	3-1
Switching Off Power and Disconnecting Cables	3-4
Removing the System Unit from its Mounting	3-5
Removing the System Unit from a Rack	3-5
Opening the System Unit	3-5
RAM Memory Modules (SIMMs)	3-6
Cache Memory Modules	3-8
Video Memory Modules	3-10
Adapters	3-11
Internal Drives	3-12
Chapter 4. Operator Information and Configuration Utility	4-1
Controls	4-1
Front Access Door	4-1
Power Switch	4-1
Light-Emitting Diodes (LEDs)	4-1
Power Supply	4-2
Prior to Initial Power-Up	4-2
Starting Up Your System	4-2
Installing an Operating System	4-4
Installing Application Programs	4-4
Air Filters	4-4
Security Features	4-5
Front Access Lock and Keys	4-5
Diskette Write-Protect Jumper	4-5

Diskette Drive and Hard Drive Access	4-5
Serial and Parallel Port I/O Control	4-6
Passwords	4-6
Power-On Password	4-6
System Administrator Password	4-6
Removing a Power-on Password or System Administrator Password	4-6
Keyboard Password	4-7
Startup Sequence Control	4-7
Unattended Start Mode	4-7
Keyboardless Operation Mode	4-7
Power Management Program	4-7
Configuration Utility	4-8
Configuration Overview	4-8
Understanding Configuration	4-8
Configuration Errors	4-9
Configuration Utility Program	4-10
Description of the Configuration Utility Program	4-10
Accessing the Configuration Utility Program	4-11
Moving Around the Configuration Utility Screens	4-11
System Information	4-12
Video	4-12
Security	4-14
Clock	4-16
Keyboard and Mouse	4-17
Input/Output Ports	4-18
Cache	4-18
Mass Storage Devices	4-19
Startup Options	4-21
Power Management	4-22
Interrupts	4-23
Memory Map	4-24
System Video BIOS (C0000 - C7FFF)	4-25
Internal Caching at (C0000-CFFFF)	4-25
Adapter Card ROM or Memory Space Available	4-28
Date and Time Settings	4-33
Device Drivers	4-33
Diskette Write-Protect Feature	4-33
Interrupt and DMA Assignments	4-34
Interrupt Request Assignments	4-34
DMA Channel Assignments	4-34
Jumpers	4-35
Changing Jumper Positions	4-35
System Board Jumpers	4-36
Memory-Retention Battery	4-38
Parallel Port	4-39
Passwords	4-42
Power-On Password	4-42
Administrator Password	4-42
Removing a Forgotten Password	4-43
Serial Port	4-44
SVGA Video	4-47
Advantages of Using SVGA	4-47
Software Compatibility with SVGA	4-47
Display Support	4-48

Video Configuration	4-48
Adding Video Memory	4-49
Special Characters and Languages	4-49
System Programs	4-50
Updating the Flash EEPROMs	4-50
Chapter 5. Problem Solving	5-1
Diagnostic Tools	5-2
Power-On Self-Test (POST)	5-2
The Configuration Utility Program	5-3
The Diagnostic Programs	5-3
Troubleshooting Charts	5-3
Error Messages	5-3
Testing the Computer	5-4
Starting the Computer	5-4
Starting the Diskette-Based Diagnostic Program	5-5
Troubleshooting Charts	5-6
Error Messages	5-13
POST Messages	5-13
Diagnostic Messages	5-17

Part 2. Hardware Maintenance Information

Chapter 6. Service Diagnostic Information	6-1
Before Replacing a System Board	6-2
FRU Isolation for 486DX4 System Boards	6-2
General Checkout	6-3
Undetermined Problem	6-6
Display	6-7
Installed Devices List	6-8
Single In-Line Memory Modules (SIMMs)	6-9
Memory Test	6-10
Symptom-to-FRU Index	6-11
Beep Code Index	6-12
Symptom/Error Index	6-12
Diagnostics and Test Information	6-17
Power-On Self Test (POST)	6-17
Diagnostics Diskette	6-17
To load the diagnostics diskette:	6-18
Diagnostic Menus	6-18
Diagnostic Diskette Main Menu	6-18
System Checkout	6-19
Diagnostic Test Select Menu	6-19
Diskette Test Select Menu	6-20
Hard Disk Drive Test Select Menu	6-20
Formatting a Hard Disk Drive	6-21
Formatting Procedure	6-21
Video Test Select Menu	6-22
Error Log	6-23
Creating the Error Log	6-23
Starting the Test	6-23
Displaying the Error Log	6-23
Keyboard	6-24

Printer	6-25
Power Supply	6-25
Chapter 7. Removal and Replacement Procedures	7-1
Switching Off Power and Disconnecting Cables	7-6
Removing the System Unit from its Mounting	7-7
Removing the System Unit from a Rack	7-7
Opening the System Unit	7-7
Feature Cards	7-8
Memory Retention Battery	7-9
RAM Memory Modules (SIMMs)	7-10
Cache Memory Modules	7-11
Video Memory Module	7-12
Microprocessor	7-13
Riser Card	7-14
System Board	7-15
Diskette Drive	7-17
diskette drive, replacing	7-17
Hard Disk Drive	7-18
CD ROM Drive	7-19
Power Supply	7-20
Front Fan	7-21
Rear Fan	7-22
LED Assembly	7-23
Power Switch	7-24
Speaker	7-25
Chapter 8. Parts Catalog	8-1
IBM Service Parts Warranty	8-1
Covers	8-2
Chassis	8-3
Fans, Power Supply, and Speaker	8-4
Air Filters, LEDs, and On/Off Switch	8-5
Diskette Drive and Mounting	8-6
Hard Disk Drive and Mounting	8-7
CD-ROM Drive and Mounting	8-8
System Board Components	8-9
Rackmount Plates and Handles	8-10
Keyboards	8-11
Power Cords	8-12

Part 3. Appendixes

Appendix A. System Records	A-1
Appendix B. 7585 Industrial Computer Physical Dimensions	B-1
Appendix C. Jumpers	C-1
Changing Jumper Positions	C-1
Jumper Descriptions	C-2
Appendix D. Interrupt and DMA Assignments	D-1
Interrupt Request Assignments	D-1

DMA Channel Assignments	D-2
Appendix E. S3 Vision864 SVGA Device Drivers Installation Instructions	E-1
Introduction to Device Drivers	E-2
Change the Refresh Rate	E-3
Refresh from AUTOEXEC.BAT	E-4
Refresh in Graphical Mode	E-5
Refresh From the Command Line	E-6
Microsoft Windows Version 3.1 Drivers	E-7
Installation	E-7
Updating the Device Drivers	E-8
DOS Drivers / Utilities	E-9
DataCAD Version 4.06 Installation	E-9
CADVANCE Version 3.51 Installation	E-11
Generic CADD Version 6.0 Installation	E-12
AutoDesk ADI Version 4.2 Installation	E-13
AutoCAD Release 11 Configuration	E-14
AutoCAD Release 12 Configuration	E-15
AutoShade Version 2.1 Configuration	E-17
3D Studio Version 1.0 Configuration	E-18
3D Studio Version 2.0 Configuration	E-19
MicroStation PC (Protected Mode) Version 4.0 Installation	E-20
MicroStation PC (Protected Mode) Version 5.0 Installation	E-21
LOTUS 1-2-3 Version 2.3 Installation	E-22
Microsoft Word Version 5.0 Installation	E-23
Index	X-1

Figures

1-1.	IBM 7585 Industrial Computer	1-1
1-2.	General component layout	1-2
1-3.	System board component locations	1-4
1-4.	Chained SCSI devices, each with a unique ID	1-11
1-5.	SCSI terminators	1-11
3-1.	System board component locations	3-2
3-2.	Diskette drive installation	3-14
3-3.	CD-ROM drive installation	3-15
3-4.	Hard disk drive installation	3-16
4-1.	Power switch and LEDs	4-1
4-2.	Sample Page 2 of the Configuration Utility Screens	4-5
4-3.	Sample Page 1 of the Configuration Utility Screens	4-12
4-4.	Sample Page 2 of the Configuration Utility Screens	4-14
4-5.	Sample Page 3 of the Configuration Utility Screens	4-17
4-6.	Sample Page 4 of the Configuration Utility Screens	4-19
4-7.	Sample Page 5 of the Configuration Utility Screens	4-22
4-8.	Sample Page 6 of the Configuration Utility Screens	4-24
4-9.	System Board Jumper Locations	4-36
6-1.	Voltage regulator probe points on 486DX4 FRU	6-2
6-2.	Keyboard connector voltages	6-24
6-3.	Power supply connector voltages	6-25
7-1.	General component layout	7-2
7-2.	System board component locations	7-4
8-1.	Covers	8-2
8-2.	Chassis	8-3
8-3.	Fans, power supply, and speaker	8-4
8-4.	Air filters, LEDs, and on/off switch	8-5
8-5.	Diskette drive and mounting	8-6
8-6.	Hard drive and mounting	8-7
8-7.	CD-ROM drive and mounting	8-8
8-8.	System board components	8-9
8-9.	Rackmount plates and handles	8-10
B-1.	Front and bottom dimensions	B-1
B-2.	Side dimensions	B-2
B-3.	Rackmount front plate dimensions (without slide rails)	B-3
B-4.	Rackmount front plate dimensions (with slide rails)	B-3

Part 1. User Information

Part 1 contains an introduction to the computer system, and it tells how to install the computer system, operate it, and solve problems with it at the user level.

Chapter 1. Overview of the 7585 Industrial Computer	1-1
General Description of Features	1-1
General Layout of Components	1-2
System Board Features	1-6
Specifications	1-7
Physical	1-7
Power Supply	1-7
Heat Output	1-7
Environment	1-7
Option Overview	1-9
RAM Memory	1-9
Cache Memory	1-9
Video Memory	1-9
Microprocessor	1-9
Adapters	1-9
Drives	1-9
Drive Sizes and Mountings	1-10
Cover Plates (Bezels)	1-10
Cables	1-10
Integrated Drive Electronics (IDE) Controller	1-10
Small Computer System Interface (SCSI) Drives	1-10
Keyboard	1-13
Pointing Devices	1-13
Parallel Devices	1-13
Serial Devices	1-13
Displays	1-14
Chapter 2. Installing Your Computer	2-1
Before You Begin:	2-1
Step 1. Unpack Your Computer	2-1
Step 2. Check the Voltage Setting	2-2
Step 3. Install Internal Options	2-3
Step 4. Mount the Computer	2-4
Free-Standing	2-4
Rack-Mount Setup with Slide Rails	2-5
Rack-Mount Setup without Slide Rails	2-6
Step 5. Connect the Cables	2-7
Step 6. Power-Up the Computer System and Check It Out	2-8
Step 7. Run the Configuration Utility	2-9
Updating the Computer Configuration Information	2-9
Step 8. Finish the Installation	2-11
Chapter 3. Installing Options	3-1
Switching Off Power and Disconnecting Cables	3-4
Removing the System Unit from its Mounting	3-5

Removing the System Unit from a Rack	3-5
Opening the System Unit	3-5
RAM Memory Modules (SIMMs)	3-6
Cache Memory Modules	3-8
Video Memory Modules	3-10
Adapters	3-11
Internal Drives	3-12
Chapter 4. Operator Information and Configuration Utility	4-1
Controls	4-1
Front Access Door	4-1
Power Switch	4-1
Light-Emitting Diodes (LEDs)	4-1
Power Supply	4-2
Prior to Initial Power-Up	4-2
Starting Up Your System	4-2
Installing an Operating System	4-4
Installing Application Programs	4-4
Air Filters	4-4
Security Features	4-5
Front Access Lock and Keys	4-5
Diskette Write-Protect Jumper	4-5
Diskette Drive and Hard Drive Access	4-5
Serial and Parallel Port I/O Control	4-6
Passwords	4-6
Power-On Password	4-6
System Administrator Password	4-6
Removing a Power-on Password or System Administrator Password	4-6
Keyboard Password	4-7
Startup Sequence Control	4-7
Unattended Start Mode	4-7
Keyboardless Operation Mode	4-7
Power Management Program	4-7
Configuration Utility	4-8
Configuration Overview	4-8
Understanding Configuration	4-8
Configuration Errors	4-9
Configuration Utility Program	4-10
Description of the Configuration Utility Program	4-10
Accessing the Configuration Utility Program	4-11
Moving Around the Configuration Utility Screens	4-11
System Information	4-12
Video	4-12
Security	4-14
Clock	4-16
Keyboard and Mouse	4-17
Input/Output Ports	4-18
Cache	4-18
Mass Storage Devices	4-19
Startup Options	4-21
Power Management	4-22
Interrupts	4-23
Memory Map	4-24
System Video BIOS (C0000 - C7FFF)	4-25

Internal Caching at (C0000-CFFFF)	4-25
Adapter Card ROM or Memory Space Available	4-28
Date and Time Settings	4-33
Device Drivers	4-33
Diskette Write-Protect Feature	4-33
Interrupt and DMA Assignments	4-34
Interrupt Request Assignments	4-34
DMA Channel Assignments	4-34
Jumpers	4-35
Changing Jumper Positions	4-35
System Board Jumpers	4-36
Memory-Retention Battery	4-38
Parallel Port	4-39
Passwords	4-42
Power-On Password	4-42
Administrator Password	4-42
Removing a Forgotten Password	4-43
Serial Port	4-44
SVGA Video	4-47
Advantages of Using SVGA	4-47
Software Compatibility with SVGA	4-47
Display Support	4-48
Video Configuration	4-48
Adding Video Memory	4-49
Special Characters and Languages	4-49
System Programs	4-50
Updating the Flash EEPROMs	4-50

Chapter 5. Problem Solving	5-1
Diagnostic Tools	5-2
Power-On Self-Test (POST)	5-2
The Configuration Utility Program	5-3
The Diagnostic Programs	5-3
Troubleshooting Charts	5-3
Error Messages	5-3
Testing the Computer	5-4
Starting the Computer	5-4
Starting the Diskette-Based Diagnostic Program	5-5
Troubleshooting Charts	5-6
Error Messages	5-13
POST Messages	5-13
Diagnostic Messages	5-17

Step 7. Run the Configuration Utility

Note: This Step assumes that you have installed all options in your system, as instructed in "Step 3. Install Internal Options" on page 2-3. If you have not, install those options now. For option installation instructions, use the appropriate procedures in Chapter 3, "Installing Options."

If your computer system has never had its configuration utility run, or if you have changed the configuration by adding or changing a feature, run the configuration utility as follows:

1. Power down the computer for several seconds and then power it up again.
2. When the icon appears in the upper right corner, press the F1 key to initiate the configuration utility. Then follow the instructions on the screen to configure the system.

Updating the Computer Configuration Information


When you start your computer for the first time after you add or remove a memory-module kit or an internal hard drive, running the Configuration Utility program automatically updates your computer configuration information. However, when a diskette drive is installed or removed, the Configuration Utility program can detect its presence or absence, but not its type and capacity. You need to use the Configuration Utility program to update this information.

If you added or removed only an adapter, no update is required, unless conflicts occur between port assignments. Use the Configuration Utility program to make the necessary changes to eliminate the conflict.

Note: If you use the Configuration Utility program to customize your computer configuration, ensure that you have a record of the customized settings *before* you complete the following steps. A form is available in Appendix A, "System Records" for recording your current configuration.

Use the following instructions to update the computer configuration information:

1. If your computer is powered-on, power it off.
2. Switch on all attached devices; then power the computer back on.

After a short delay, the IBM logo appears, the computer starts the POST, and the Configuration Utility program symbol  appears in the upper-right corner of the screen while the memory counting appears in the upper-left corner of the screen. Following the completion of the memory test, a configuration error message similar to the following one appears. (This is normal because you changed your computer configuration when you added or removed options.)

The following error(s) were detected when the system was started.

162 Configuration change has occurred

Press Enter to run the Configuration Utility or Esc to continue.

3. Press the **Enter** key to start/run the Configuration Utility program.

Notes:

- a. If a password prompt appears instead of the Configuration Utility screen, an Administrator Password has been set. In this case, you must type the Administrator Password before you can use the Configuration Utility program.
- b. When you run the Configuration Utility program after just adding or removing an option, the Configuration Utility program automatically updates (in most cases) the configuration information for that added or removed option. This is done without affecting the settings of any other features.

However, when a diskette drive is installed or removed, the Configuration Utility program can detect its presence or absence, but not its type and capacity. You need to update this information on the applicable Configuration Utility screen, as explained in step 4.
- c. When the Configuration Utility screen appears, a pointer will appear besides the options just added or removed.

4. Make any necessary changes on the Configuration Utility screens.

Notes:

- a. Only fields that have square brackets can be changed.
- b. Use the up arrow and down arrow keys (\uparrow and \downarrow) to move from one field to the next. Use the left arrow and right arrow keys (\leftarrow and \rightarrow) to change the settings within the fields. Press the **Page Down** and **Page Up** keys to move from page to page.
- c. If you installed a hard-disk drive, ensure that the hard-disk drive that you installed is included as a Startup Device under "Startup Options" (on page 4 of the Configuration Utility screens); otherwise, you will not be able to boot your system from your hard disk.

In addition, if you find that your hard-disk drive is not capable of running in High Performance mode (the default selection for Primary and Secondary IDE Mode), use the same screen to switch to Compatible mode.

5. To save the new configuration information and end the program, press the **Esc** key and follow the instructions on the screen.

A panel appears and gives you the opportunity to save or cancel the configuration changes you made.

6. Record the new configuration information on the device-record form in Appendix A, "System Records."

Notes:

1. To install a device driver (a program that supports a specific type of hardware device), see the instructions that came with the option you installed. Those instructions will tell you if a device driver is required and, if so, how to install it.
2. If you have no device drivers to install, continue with the installation procedures (or other procedures) that brought you to this chapter.

Step 8. Finish the Installation

Your computer hardware is now set up and you are ready to finish the installation by installing the required software and completing the paperwork. These final steps are different for various configurations and applications, but you may use the following checklist as a guide.

- Install your operating system.**
Refer to the documentation and instructions supplied with your operating system.
- Install your application programs.**
Refer to the documentation and instructions supplied with your application programs.
- Make any backup copies necessary.**
It is very important that you keep a backup copy of the system partition, reference diskette, hard files, etc., in case of possible future use.
- Record your identification numbers.**
Your computer might have important identification information that you might need if you have it serviced or if you need to order duplicate keys (for keylock-equipped systems). You should record all such information in Appendix A, "System Records" on page A-1 or in another safe place.
- Complete your registration or warranty forms.**
Complete and return the registration cards that came with your computer.

Adapters

To install an adapter:

1. Remove the system unit's cover, as described in "Opening the System Unit" on page 3-5.
2. Read the instructions that came with the adapter to determine if the adapter must be installed in a certain slot. If not, you may use any empty slot. Determine which empty slot you will use.
3. Note the locations of any installed adapters or drives that are in the way, and then remove them.
4. Open the adapter card retainer as follows:
 - a. Loosen the two screws on the side latch and the larger screw on the top.
 - b. Slide the side latch up to disengage it.
 - c. Extend the retainer side piece straight out and the pivot the the retainer up and out of the way.
5. Remove the expansion slot cover (one screw) and save it.
6. Read the instructions that came with the adapter to determine if you must set any switches, jumpers, etc. on the adapter.
7. Touch the static-protective bag in which the adapter was packaged to any unpainted metal surface on the computer. Then remove the adapter from the package.
8. Set any required switches, jumpers, etc. on the adapter. Also, install any required memory modules on it.
9. Install the adapter as follows:
 - a. Grasp the adapter at the front and rear.
 - b. Align the adapter with the front and rear adapter guides and slide it into the guides. (Some adapters are shorter and do not extend to the front adapter guide.)
 - c. Press the adapter *firmly* into the expansion slot. Full-length adapters slide into the latch on the front adapter guide.
 - d. Install and tighten the expansion slot screw.
10. Reinstall any removed adapters into their original slots.
11. Move the adapter card retainer back into place, making sure that the card retainer blocks engage the adapter cards firmly. Then close the retainer latch and tighten the three screws previously loosened.
12. Slide the chassis forward and fasten the four knurled thumbscrews that secure it.
13. Reinstall the cover.
14. Record the type of adapter you just installed in Appendix A, "System Records."

Internal Drives

This generalized mounting procedure applies for all different types of internal drives — diskette, hard disk, CD-ROM, etc. Different types of hardware (*slide rails, trays, and shock mounts*) are used to install a drive in a bay. The type of drive and its physical size determine exactly what combination of hardware you will need; however, all drives must be installed in the 7585 with specially designed mounting rails that come with supported drives or are orderable in mounting kits.

Important: Some drives do not meet the industrially rated environmental specifications of the 7585 Industrial Computer. Before installing any drive that is not purchased from IBM or an IBM distributor specifically for use in a 7585, be sure that the drive's specifications meet all environmental conditions to which it might be subjected.

Warning: If you are installing a CD-ROM drive, do not attempt to use the diskette drive signal cable for attaching the CD-ROM drive, even though the connectors appear to match. That cable is not intended for attaching CD-ROM drives, and serious damage to the drive could result. If you want to attach a CD-ROM drive, you must install an appropriate adapter (CD-ROM, SCSI, etc.).

To install an internal drive:

1. Remove the system unit's cover and slide the chassis back, as described in "Opening the System Unit" on page 3-5.
2. Determine into which drive bay the new drive will be installed.

Note: If other existing drives are blocking access to that bay, they will have to be temporarily removed. That will be done in a later step in this procedure.

3. If the drive to be installed has removable media, remove the appropriate blank cover plate from the front of the computer. It must be replaced with a new drive cover plate.

Note: If the new drive comes with a second, different color bezel or cover plate, be sure to install the matching plate. In some cases, the plate must be installed on the drive before the drive is installed in the computer.

4. Read the instructions that came with the drive to determine any special instructions for:
 - Installing or changing drive installation hardware
 - Setting jumpers or switches
 - Removing or installing a terminator
 - Setting a unique drive ID (SCSI drives only)

Note: When you update your configuration information, as explained in "Configuration Utility" on page 4-8, ensure that the hard-disk drive that you installed is included as a Startup Device under "Startup Options" (on page 4 of the Configuration Utility screens); otherwise, you will not be able to boot your system from your hard disk.

In addition, if you find that your hard-disk drive is not capable of running in High Performance mode (the default selection for Primary and Secondary IDE Mode), use the same screen to switch to Compatible mode.

5. **You must use mounting hardware specifically designed for use in a 7585.** Such hardware is available in a 7585 drive mounting kit feature, or in

some cases, is provided with supported drive features. Do not attempt to use mounting hardware that came with your drive unless it was specifically designed for use in a 7585. Install the appropriate hardware on the new drive as follows:

Direction of drive connectors and mounting rail latches:

- **If the new drive is to be used in a rear drive bay**, prepare to install it with its cable connectors toward the front of the system unit. Prepare also to attach the rails to the drive so that their latches are toward the front of the system unit too.
- **If the new drive is to be used in a front drive bay**, prepare to install it with its cable connectors toward the rear of the system unit. Prepare also to attach the rails to the drive so that their latches are toward the rear of the system unit too.

Installing the rails:

Note: The rails and other mounting kit hardware are designed with different sets of holes to accommodate many different drive hole configurations. You should use the holes that best suit your particular combination of drives.

- **To install a 3½ inch drive into a 3½ inch bay**, use the mounting kit for a 3½ inch bay. Refer to Figure 3-2 on page 3-14. Attach the two slide rails with the four screws provided in the mounting kit. (Shock mounting is not possible with this combination.)
 - **To install a 5¼ inch drive into a 5¼ inch bay**, use the mounting kit for a 5¼ inch bay. Refer to Figure 3-3 on page 3-15. Attach the slide rails to the drive with the grommets, bushings, spacers, and flathead screws provided in the mounting kit. (Thus, all 5¼ inch drives are shock mounted.)
 - **To install a 3½ inch drive into a 5¼ inch bay**, use the mounting kit for a 5¼ inch bay. Refer to Figure 3-4 on page 3-16. First attach the slide rails to the two L-shaped brackets with the grommets, bushings, spacers, and flathead screws provided in the mounting kit. Then attach the drive to the carrier tray with four screws provided. Finally, attach the carrier tray between the L-shaped brackets. (This combination is useful for shock mounting a 3½ inch drive.)
6. Remove the two screws securing the internal front fascia at the top, and pivot the fascia forward to disengage it from the front of the chassis. Set the fascia out of the way. (The wires are long enough so that they may remain connected.)
 7. If another existing drive is blocking access to the bay where the new drive is to be installed, temporarily remove it as follows:
 - a. Disconnect all cables to it.
 - b. Slide the drive out the front of the computer. A front-mounted drive will slide out easily; for a rear-mounted drive, you must release the mounting rail latches that secure it on each side.
 8. Slide the new drive through the front of the computer and into the selected bay until its rail latches detent into place.
 9. Connect the signal cable(s) to the new drive. (Cable connectors are keyed and connect only one way.)
 10. Connect the four-wire power supply cable, if required, to the drive.

11. Reinstall any drives that were temporarily removed, and connect their cables, just as you did with the new drive.
12. Reinstall the internal front fascia assembly as follows:
 - a. Insert the two feet of the fascia into their slots in the chassis.
 - b. Pivot the fascia upward to its normal position.
 - c. Install the two screws securing the top of the fascia.
13. If the drive you installed came with a special cover plate for removable media, install that cover plate in place of the one you removed.
14. Slide the chassis forward and fasten the four knurled thumbscrews that secure it.
15. Reinstall the cover.
16. Record the type of drive you just installed in Appendix A, "System Records."

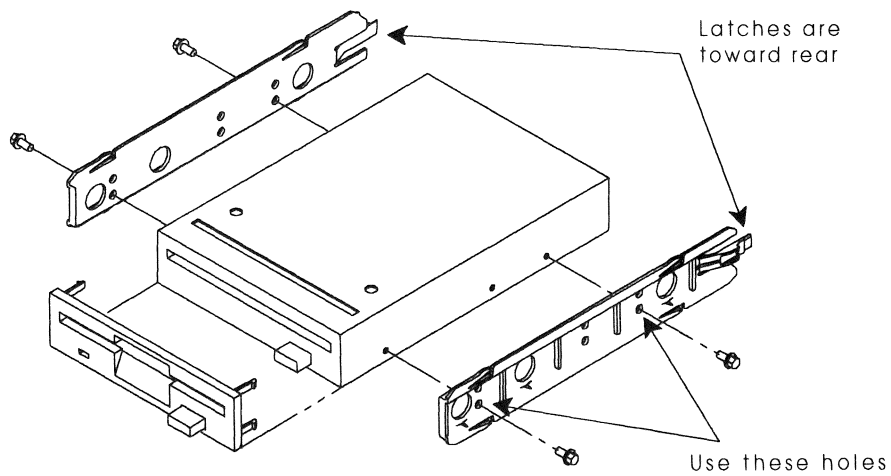


Figure 3-2. Diskette drive installation

Chapter 4. Operator Information and Configuration Utility

The operation of your IBM 7585 Industrial Computer depends primarily upon the system board, system configuration, operating system, and application programs in your particular computer. The first part of this chapter briefly gives very general user information concerning the features of the 7585 Industrial Computer. The remainder of the chapter explains how to use the different screens of the Configuration Utility.

Controls

Front Access Door

A bottom-hinged access door on the front of the 7585 covers the power switch, LEDs, and removable media drives. The door has a rubber seal to prevent dust from entering through the door. Thus it should be kept closed when possible. When the door is closed, the LEDs are still visible through windows in the door.

To open the front access door, simply turn its knurled knob one-quarter turn to the right and pull. Then, to close the door, pivot it up and latch it by turning its knurled knob one-quarter turn to the left.

Power Switch

The power switch is located inside the front access door. It is a rocker type switch with the standardized markings **O** for off and **|** for on.

Light-Emitting Diodes (LEDs)

The 7585 has four light-emitting diodes (LEDs) located inside the front access door:

- The leftmost (green) LED indicates that power is on.
- The next (yellow) LED indicates that a hard drive is reading or writing data.
- The rightmost two (yellow) LEDs are not used for any prescribed purpose; they may be connected for user applications where signals are required. Their connector is behind the LEDs.

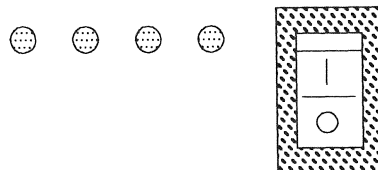


Figure 4-1. Power switch and LEDs

Power Supply

The power supply on the 7585 Industrial Computer has a switch on it which must be manually set before the computer is powered up. The switch is located in the area where the power cord plugs into the system unit. It is marked either "110/220" or "115/230."

Use the following instructions to set the switch. You may use a ball-point pen to slide the switch to the correct position.

- If the voltage range in your country is between 90 and 137 volts, set the switch so that "110" or "115" is visible.
- If the voltage range in your country is between 180 and 265 volts, set the switch so that "220" or "230" is visible.

Warning: Be sure the voltage-selection switch is in the correct position. If you set this switch to the wrong position, you might damage your computer when you turn it on.

Prior to Initial Power-Up

Before attempting to power-up your computer system, ensure that all of the following conditions are met:

- All internal and external options are properly installed.
- All power supply switches are set correctly for your power source. Refer to "Power Supply" and to "Step 2. Check the Voltage Setting" on page 2-2.
- All signal cables are properly connected.
- All power cables are plugged into grounded electrical outlets.
- All covers are properly installed.

Starting Up Your System

Switch on the computer. The following should occur:

1. A blinking cursor appears on the screen
2. After a short time, an icon showing a computer screen appears in the upper right corner,



and the RAM memory test message appears in the upper left corner.

3. The computer starts the power-on self test (POST).
4. If the POST completes successfully, the amount of available memory is displayed, and a single beep occurs.
 - *If the POST does not complete successfully*, an error code is displayed. Also, either no beep or multiple beeps might occur. In this case, check the screen for the error message, and refer to Chapter 5, "Problem Solving" on page 5-1 to resolve the problem.
 - *If the POST does complete successfully*, proceed to the next step.

5. If this is the first time that your system has been powered up, or if its configuration has been changed, run the configuration utility as follows:
 - a. Power down the computer for several seconds and then power it up again.
 - b. When the icon appears in the upper right corner, press the F1 key to initiate the configuration utility. Then follow the instructions on the screen. (For detailed information about using the Configuration Utility, refer to "Configuration Utility" on page 4-8.)
6. After running the configuration utility, install your operating system and then your application programs.

Installing an Operating System

You must have an operating system installed on your computer before you can use it for running any tasks. The 7585 Industrial Computer supports the following operating systems:

- Disk Operating System (DOS)
- Operating System/2* (OS/2*)

For information about installing and using your operating system, refer to the manuals that came with the operating system.

Installing Application Programs

For your computer to be able to perform the tasks that meet your needs, you must install application programs. For information about installing and using your application programs, refer to the manuals that came with the application programs.

Note: Before installing any application program, you must ensure that your system contains all of the storage requirements for that program.

Air Filters

The 7585 Industrial Computer contains three foam type air filters that must be cleaned or replaced periodically.

- To remove the door louvre air filter for cleaning or replacing, open the front access door and pull up the filter element. When reinstalling the filter element, be sure to push its entire length in all the way.
- To remove the front fan air filter for cleaning or replacing, open the front access door and slide the filter holder to the right. If you are going to replace the filter element, slide the old filter element out of the top of the holder and slide in a new element. When reinstalling the filter holder, be sure to engage it properly on both the top and bottom tracks before sliding it to the left.
- To remove the rear fan air filter for cleaning or replacing, remove the two screws that secure the filter cover around the fan, pull the cover out, and replace the filter element.

Security Features

Security involves protecting your computer components and preserving the data stored in your computer. There are several security features available to help protect your computer, the hardware inside, and the information stored on your hard disk.

Front Access Lock and Keys

To prevent unauthorized access to the diskette drive or other removable media, a special key-lock may be installed on the front access door of the system unit. **This special key-lock is available only from your IBM authorized dealer; it is not available directly from IBM.**

If your computer has the key-lock feature installed, you should record the key's serial number and manufacturer's address in Appendix A, "System Records" on page A-1 or in a secured place. If replacement or duplicate keys are needed, they must be ordered from the lock's manufacturer.

Diskette Write-Protect Jumper

The diskette write-protect jumper allows the diskette drives to read information from a diskette, but prevents the diskette drives from writing information to the diskettes. The default setting for this jumper allows both reading from and writing to the diskette drives. The jumper setting must be changed to provide the protection feature; refer to item 14 in Figure 1-3 on page 1-4.

Diskette Drive and Hard Drive Access

To prevent unauthorized reading or writing to the hard drive(s) or the diskette drive(s), drive access can be disabled by selecting that option in the Configuration Utility program. (The hard disks can be disabled only as a pair.) The Security screen, on page 2 of the Configuration Utility screens (see Figure 4-2) contains the field for controlling access to diskette drive and (if applicable) hard-disk drive read/write operations.

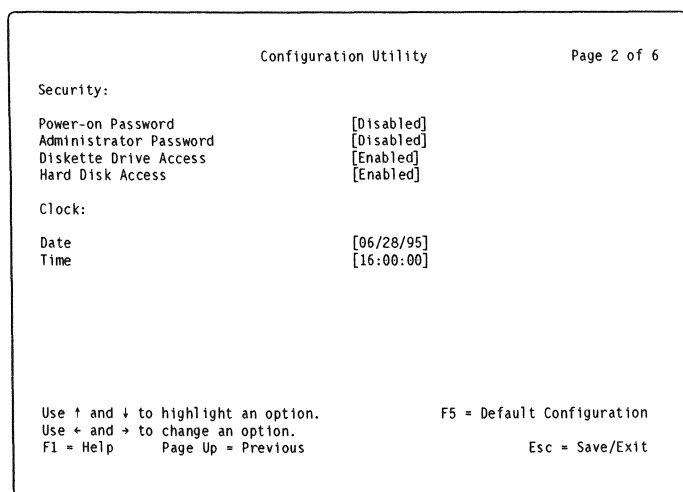


Figure 4-2. Sample Page 2 of the Configuration Utility Screens

Serial and Parallel Port I/O Control

This feature can disable input and output functions of the serial and parallel ports and their attached devices. The control of this feature is set by accessing the Configuration Utility program during the computer's Power-On Self Test (see "Power-On Self Test (POST)" on page 6-17).

Passwords

Password security is implemented by a power-on password, a System Administrator password, and a keyboard password. The Configuration Utility program gives directions for setting, changing, and disabling the passwords. The Security section, on page 2 of the Configuration Utility screens (see Figure 4-2 on page 4-5), contains the fields for setting, changing, or disabling power-on or administrator passwords. Refer to "Power-On Self Test (POST)" on page 6-17 for gaining access to the Configuration Utility program.

If it should become necessary to remove either a power-on password or System Administrator password because it is forgotten or for servicing, follow the procedure given in "Removing a Power-on Password or System Administrator Password."

Power-On Password

A power-on password denies access to the computer by an unauthorized user when the computer is powered on. When a power-on password is active, the password prompt appears on the screen each time the computer is powered on. The computer starts only after the correct password is entered.

System Administrator Password

The System Administrator password restricts access to the Configuration Utility, which controls the security features. Once the Administrator Password is set, the password prompt appears each time an attempt is made to access the Configuration Utility program.

Removing a Power-on Password or System Administrator Password

If it should become necessary to remove either a power-on password or System Administrator password because it is forgotten or for servicing, do the following:

1. Power-off the computer.
2. Remove the memory retention (lithium) battery for 15 minutes. (For instructions on removing the battery, refer to "Memory Retention Battery" on page 7-9.) This erases the password from memory.
3. Reinstall the battery.
4. Power-on the computer.

Note: After removal of the memory retention battery, the Configuration Utility program automatically resets all configuration settings to the default (factory) setting. Thus, the Configuration Utility must be run the next time the system is turned on after the battery is removed.

Keyboard Password

A keyboard password allows locking the keyboard while the computer is turned on. Setting the keyboard password depends on the operating system. The OS/2 operating system provides keyboard-password protection as a standard feature; other operating systems might or might not offer this feature. Refer to your operating system documentation for more information.

Startup Sequence Control

The computer has a default startup sequence that checks diskette drives first, then any available hard drive, then any other startup device that may be installed. You can change the startup sequence by arranging the startup devices in any order that meets your needs. For example, you can make your hard drive your primary startup device, thereby preventing a person from starting the computer from a diskette drive.

You can *customize* the startup sequence by changing the order in which the computer checks the devices by accessing the Configuration Utility program (see "Power-On Self Test (POST)" on page 6-17).

Unattended Start Mode

After setting a power-on password, you can set the computer to operate in the *unattended start mode*. This mode locks the keyboard and mouse, but allows the computer to start the operating system and carry out the instructions in the CONFIG.SYS and AUTOEXEC.BAT files. Although the password prompt does not appear, the keyboard and mouse remain locked until the correct password is entered. This mode is ideal for network servers and other computers that operate unattended. If a power failure occurs, the computer automatically restarts when power returns and resumes normal operation, without operator intervention.

The unattended start mode is enabled or disabled by using the Configuration Utility Program (see "Power-On Self Test (POST)" on page 6-17).

Keyboardless Operation Mode

The configuration Utility Program allows an option for starting the system without a keyboard attached.

Power Management Program

Power management is a standard feature that reduces the power consumption of your computer when it is not in use. Power management automatically initiates reduced power modes for the processor and hard disk after a specified period of inactivity. The Configuration Utility program has a default setting of 30 minutes for automatically initiating power management. This time can be changed by accessing the Configuration Utility program (see "Power-On Self Test (POST)" on page 6-17).

Configuration Utility

The remainder of this chapter explains the use of the Configuration Utility . The following topics are discussed:

- Configuration Overview (page 4-8)
- Configuration Utility Program (page 4-10)
- Date and Time Settings (page 4-33)
- Device Drivers (page 4-33)
- Diskette Write-Protect Feature (page 4-33)
- Interrupt and DMA Assignments (page 4-34)
- Jumpers (page 4-35)
- Memory-Retention Battery (page 4-38)
- Parallel Port (page 4-39)
- Passwords (page 4-42)
- Serial Port (page 4-44)
- SVGA Video (page 4-47)
- System Programs (page 4-50)

Configuration Overview

Your computer has a special type of memory that maintains an inventory of its features and their associated settings. This inventory is the *configuration information*. A memory-retention battery on the system board keeps the memory active so it does not lose the configuration information when you turn off the computer. The battery-backed memory maintains information about the:

- Cache
- Date and Time settings
- Diskette drives and hard disk drives
- Keyboard and mouse information (if attached)
- Memory map
- Power management
- Processor information
- Security features and passwords
- Selectable features
- Serial and Parallel ports
- Video information

Understanding Configuration

Many built-in features, such as the serial and parallel ports, have programmable (changeable) settings. Each time you turn on the computer, the settings are copied from memory to the various features to get them ready for operation. You can change these settings through the Configuration Utility program.

You also use the Configuration Utility program to update the configuration information whenever you install an optional feature.

Each device in your computer configuration must have a unique setting. The microprocessor uses the configuration settings to communicate with each device in your computer system. If two devices have the same setting, the conflict prevents the microprocessor from sending specific instructions to either device.

ISA-bus (AT-bus) compatible, 16-bit adapters have either fixed settings or settings that you control through jumpers or switches. Refer to the documentation that

comes with the adapter for information about jumper settings. You cannot control these settings by using the Configuration Utility program. However, you can use the Configuration Utility program to change the setting of a built-in feature to one that does not conflict with an adapter. For example, a conflict occurs if you install a serial adapter set as Serial 1 (primary), because your built-in Serial A port already has that setting. Use the Configuration Utility program to change the built-in Serial 1 port assignment to another setting, if possible, or disable it.

Configuration Errors

Each time you turn on the computer, the power-on self-test (POST) compares the stored configuration information with the installed hardware. If there is a mismatch, POST displays a configuration error. A configuration error can occur under any of the following conditions:

- You added or removed memory or a drive.
- You did not turn on an external device.
- A device is not working correctly and POST cannot detect its presence.
- A configuration conflict exists (two devices have the same settings).

If a configuration error occurs, an error code, similar to the following, appears on the screen.

```
The following error(s) were detected when the system was
started.
```

```
162 Configuration change has occurred
```

```
Press Enter to run the Configuration Utility or Esc
to continue.
```

When the error message appears, the pop-up screen gives you a choice: you can either press **Enter** to run the Configuration Utility program, or you can press **Esc** to bypass the error and continue with the operating system startup.

If you just added or removed an option, running the Configuration Utility program automatically updates the configuration information for the option you just added or removed, without affecting the settings of any other features.

Configuration Utility Program

The Configuration Utility program is a tool you can use for viewing and changing the configuration of your computer. The Configuration Utility program performs a number of tasks automatically, but there are other tasks that require input from you. You have access to such tasks as working with the configuration, setting a power-on or administrator password, and changing the date and time.

The memory-retention battery keeps the configuration memory active, even when you turn off your computer. If the battery fails, the memory loses the settings and the Configuration Utility program automatically restores your system to the default (factory) settings.

Note

Pressing **F5** while in the Configuration Utility program will restore your computer's configuration to the default (factory) settings. The restore function will, however, attempt to preserve diskette drive types and avoid setting a configuration that has conflicts.

Description of the Configuration Utility Program

The Configuration Utility program gives you the opportunity to view, and in some cases, change information about your computer. The Configuration Utility program automatically notes changes that occur in your computer hardware.


When you look at the Configuration Utility program screens, you notice that some *fields* (data areas) have square brackets, while other fields contain text only. The square brackets indicate a field that you can change; the Configuration Utility program fills in all other fields. If you see an arrow ► pointing to any of the fields on the screen, the Configuration Utility program is noting configuration changes that have occurred since the last time you used the program.

The Configuration Utility program screens show information about the following areas:

- System Information
- Video
- Security
- Clock
- Keyboard and Mouse, if attached
- Input/Output Ports
- Cache
- Mass Storage Devices
- Startup Options
- Power Management
- Interrupts
- Memory Map

Accessing the Configuration Utility Program

If a configuration error occurs during POST, the Configuration Utility program displays a message that describes the errors found by POST and gives you the option to access the Configuration Utility program. You also can access the Configuration Utility program any time you want to check your settings. To access the Configuration Utility program:

1. Remove all media (diskettes, CDs, tapes, and so on) from all drives.
2. Turn on the computer. If it is already on, you must turn off the computer for a few seconds, then turn it back on.
3. While the POST memory test is counting, the Configuration Utility program symbol  appears in the upper-right corner of the display screen. Press **F1** while the memory is still counting to access the Configuration Utility program and skip memory testing. Page 1 of the Configuration Utility program appears.

Note: If you have set an Administrator Password, a password prompt appears. You must type the correct Administrator Password before you can use the Configuration Utility program.

You can get help information about any item on the screen by moving the cursor to the field and pressing **F1**. The active keys are shown at the bottom of each screen in the Configuration Utility program.

Moving Around the Configuration Utility Screens

Use the up arrow and down arrow keys (**↑** and **↓**) to move from one field to the next. Each field is highlighted as you move from one option to another. Use the left arrow and right arrow keys (**←** and **→**) to change the setting within fields that have square brackets. Press the **Page Down** and **Page Up** keys to move from page to page.

When you are ready to exit from the Configuration Utility program, press **Esc** and follow the directions on the screen.

System Information

As Figure 4-3 shows, the System Information section is on page 1 of the Configuration Utility screens. This section includes information about the processor, processor speed, system memory, and the revision level of Flash EEPROM (electrically-erasable programmable read-only memory) located on the system board. If a math coprocessor is installed, this page also indicates that. The Configuration Utility program changes the information in this section automatically after you add or remove options or install updates to the Flash EEPROM located on the system board.

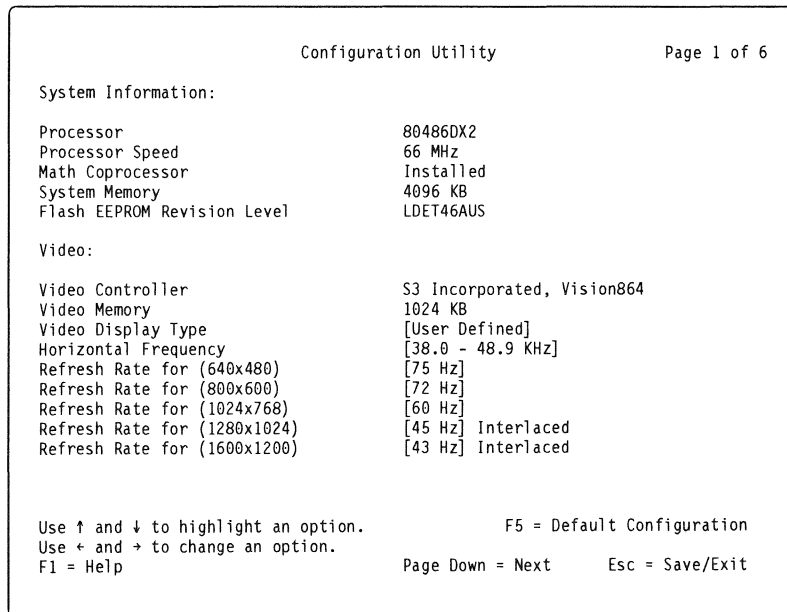


Figure 4-3. Sample Page 1 of the Configuration Utility Screens

- Processor** Identifies the processor present on the system board.
- Processor Speed** Displays the speed of the processor.
- Math Coprocessor** If a math coprocessor is installed, it is indicated as such on this page.
- System Memory** Displays the total amount of system memory installed.
- Flash EEPROM Revision Level** Displays the revision level of the electrically-erasable programmable read-only memory, which indicates the level of system software currently stored in the Flash EEPROM located on the system board.
- Video** Page 1 of the Configuration Utility screens (see Figure 4-3), provides information related to the type of video controller and display you have. Page 1 also provides options for you to change the video refresh rates for varying screen resolutions.

Video Controller	Identifies the video controller chip, or chip set, present on the system board.
Video Memory	Displays the amount of video memory, in kilobytes, installed in the computer. The video controller uses this memory to process images.
Video Display Type	Displays a field that you can use to name the type of display you have attached to your computer. The type of display you select from the list determines the video resolutions and refresh rates. If your display is not listed, you can select Custom or User Defined display types.
Horizontal Frequency	Displays the current horizontal frequency (<i>horizontal sweep rate</i>) for User Defined display types only. This field does not appear unless you select the User Defined option. Refer to the documentation that came with your display to determine the highest horizontal frequency your display can support. If you change this option, your computer automatically restarts when you exit the Configuration Utility program.
Refresh Rate	If you select Custom in the Video Display Type field, you can change the refresh rates for each resolution listed. Refer to the documentation that came with your display for the proper settings. If you change this option, your computer automatically restarts when you exit the Configuration Utility program.

Security

The Security section, on page 2 of the Configuration Utility screens (see Figure 4-4), contains the fields for setting, changing, or disabling power-on or administrator passwords. You can set a power-on password to protect the information stored in your computer and an administrator password to deny access to the Configuration Utility program. In addition, you can control access to diskette drive and (if applicable) hard-disk drive read/write operations.

Configuration Utility		Page 2 of 6
Security:		
Power-on Password	[Disabled]	
Administrator Password	[Disabled]	
Diskette Drive Access	[Enabled]	
Hard Disk Access	[Enabled]	
Clock:		
Date	[06/28/95]	
Time	[16:00:00]	
Use ↑ and ↓ to highlight an option.		F5 = Default Configuration
Use ← and → to change an option.		Esc = Save/Exit
F1 = Help	Page Up = Previous	

Figure 4-4. Sample Page 2 of the Configuration Utility Screens

Power-on Password

Shows if a power-on password is set (enabled) and gives you the opportunity to change it. Use the right and left arrow keys to enable and disable this feature. If you change this option, your computer automatically restarts when you exit the Configuration Utility program.

Administrator Password

Shows if an administrator password is set (enabled) and gives you the opportunity to change it. Use the right and left arrow keys to enable and disable this feature. If you change this option, your computer automatically restarts when you exit the Configuration Utility program.

Diskette Drive Access

Indicates that internal diskette drives are *enabled* (ready for read and write operations) or *disabled* (not accessible for read or write operations). If you change this option, your computer automatically restarts when you exit the Configuration Utility program.

Hard Disk Access

Displays the status of the hard disks (if applicable) attached to the IDE controller on the system board. The *disabled* setting prevents hard disks from reading or writing data. If you change this option, your computer automatically restarts when you exit the Configuration Utility program.

Setting a Power-On or an Administrator Password: Follow these instructions to set either a power-on or an administrator password:

1. Use the up arrow and down arrow keys (↑ and ↓) to highlight the password field you want to change.
2. Press the left or right arrow key (← or →) to access the password screen. At the prompt, type a password that contains up to seven characters.
3. At the prompt, enter the password a second time to verify it.
4. When you complete these steps, you see *Enabled* in the corresponding password field.

Changing a Power-On or an Administrator Password: To change a power-on or administrator password:

1. Use the up arrow and down arrow keys (↑ and ↓) to highlight the password field to change.
2. Press the left or right arrow key (← or →) to access the password screen.
3. Type the current password.
4. At the prompt, enter the new password.
5. At the prompt, enter the new password a second time to verify it.
6. When you complete these steps you see *Enabled* in the corresponding password field.

Note: You can also change the power-on password when you start your system by doing the following:

1. Type the current password.
2. Press **Esc**.
3. Then follow the instructions on the screen for changing your password.

Disabling a Power-On or an Administrator Password: To disable a power-on or administrator password:

1. Use the up arrow and down arrow keys (↑ and ↓) to highlight the password field you want to change.
2. Press the left or right arrow key (← or →) to access the password screen. At the prompt, type the current password.
3. At the prompt, press **Enter** to disable password protection.
4. When you complete these steps you see *Disabled* in the corresponding password field.

Note: You can also disable the power-on password when you start your system by doing the following:

1. Type the current password.
2. Press **Esc**.
3. Then follow the instructions on the screen for disabling your password.

For instructions for removing a forgotten password, see page 4-43.

Clock

The Clock section, on page 2 of the Configuration Utility screens (see Figure 4-4 on page 4-14), can be used to set the date and time as follows. You can also set the date and time by using your operating system.

Date Shows the current date. The format of the day, month and year might depend on your country. Type in the correct date.

Time Shows the current time. Type in the correct time.

Keyboard and Mouse

The Keyboard and Mouse section, on page 3 of the Configuration Utility screens (see Figure 4-5), displays information about an attached keyboard or mouse, if applicable.

Configuration Utility		Page 3 of 6
Keyboard and Mouse:		
Keyboard Speed	[Normal]	
Keyboard NumLock State	[On]	
Keyboardless Operation Mode	[Disabled]	
Mouse	Installed	
Input/Output Ports:		
Serial Port A	[3F8-IRQ4] COM1	
Serial Port B	[2F8-IRQ3] COM2	
Parallel Port	[3BC-IRQ7] LPT1	
Parallel Port Mode	[PC/AT (Compatible)]	
Cache:		
Internal Cache	8 KB [Enabled]	
External Cache	Not Installed	
Use ↑ and ↓ to highlight an option.		F5 = Default Configuration
Use ← and → to change an option.		Page Down = Next
F1 = Help		Esc = Save/Exit

Figure 4-5. Sample Page 3 of the Configuration Utility Screens

Keyboard Speed

If a keyboard is attached, it indicates the current typematic rate (the speed at which the keyboard responds when you hold down a key). Use the left and right arrow keys to choose either Normal or Fast.

Keyboard NumLock State

For an attached keyboard, displays the status of the NumLock key when you start the computer. Use the left and right arrow keys to choose: On (sets the numeric keypad keys for use as numeric keys) or Off (sets the numeric keypad keys for use as cursor keys).

Keyboardless Operation Mode

Displays the current status of this mode (enabled or disabled). Use the left and right arrow keys to choose: Enabled (sets the computer to work without a keyboard) or Disabled (sets the computer to work with a keyboard). The default setting is Disabled.

Mouse

Indicates if an external mouse is attached. The Configuration Utility program automatically detects the absence or presence of a mouse when the computer starts up.

Input/Output Ports

The Input/Output Ports section, on page 3 of the Configuration Utility screens (see Figure 4-5 on page 4-17), displays information about the input/output ports on your computer:

Serial Ports A and B	Show the current port address and interrupt level. The interrupt level of each device helps the microprocessor to make a priority list for tasks that can be <i>interrupted</i> in order to process an instruction with a higher priority. Use the right and left arrow keys to change the <i>interrupt request</i> (IRQ) settings so that each device has a unique setting. The DOS/Windows and OS/2 serial port labels (such as COM1 and COM2) are displayed for each port. These settings rarely need to be changed from the default settings. For more information about the serial ports, see page 4-44.
Parallel Port	Displays the current port address and interrupt level. Use the right and left arrow keys to change the setting so that each device has a unique setting. For more information about the parallel port, see page 4-39.
Parallel Port Mode	Indicates the present mode of operation of the parallel port attached to the system board. If the parallel port is disabled, this field does not appear.

Cache

The Cache section, on page 3 of the Configuration Utility screens (see Figure 4-5 on page 4-17), provides information about the internal and external cache installed in your computer:

Internal Cache	Indicates the size of the cache in kilobytes and the enabled or disabled status of the internal cache capability of your computer's microprocessor. Square brackets enclose this field, so you can use the right and left arrow keys to enable or disable this feature.
External Cache	Shows the size of the external cache, if installed, and its status (enabled or disabled). Use the right and left arrow keys to enable or disable this feature.

The internal cache and external cache are enabled each time you turn on your computer. If you choose to disable the cache, the setting will be in effect until the machine is turned off. When the cache is enabled, you might see an improvement in the processing time for some application programs.

Mass Storage Devices

The Mass Storage Devices section, on page 4 of the Configuration Utility screens (see Figure 4-6), displays information about storage devices that are attached to the IDE controller on the system board. With the exception of the Diskette Drive fields, which provide various drive options, the fields in this section are filled by the Configuration Utility program.

Configuration Utility		Page 4 of 6
Mass Storage Devices:		
Diskette Drive 0	[1.44 MB 3.5"]	
Diskette Drive 1	Not Installed	
Hard Disk 0	270 MB (IDE)	
Hard Disk 1	270 MB (IDE)	
Primary IDE Mode	[Compatible]	
Secondary IDE Mode	[Compatible]	
Startup Options:		
First Startup Device	[Diskette Drive 0]	
Second Startup Device	[Hard Disk 0]	
Third Startup Device	[Network]	
Fourth Startup Device	[Disabled]	
Unattended Start Mode	[Enabled]	
Use ↑ and ↓ to highlight an option.		F5 = Default Configuration
Use ← and → to change an option.		Page Down = Next
F1 = Help		Esc = Save/Exit

Figure 4-6. Sample Page 4 of the Configuration Utility Screens

- Diskette Drive 0** Displays the diskette drive configurations that you have selected. Use the left and right arrow keys to select the correct drive.
- Diskette Drive 1**
- 1.44 MB 3.5"
 - 2.88 MB 3.5"
 - 360 KB 5.25"
 - 1.2 MB 5.25"
- Hard Disk 0, 1, 2, 3** Displays the total storage space and the IDE controller designation (either Primary or Secondary) for each hard disk drive connected to the system board IDE controllers. The Configuration Utility program changes the information in these fields automatically after you add or remove hard disk drives.

**Primary IDE
Mode
Secondary
IDE Mode**

Displays the current mode selection, either High Performance or Compatible for the two IDE hard disk controllers on the system board. The default selection is High Performance and this mode makes use of all available functions. If you have an IDE device that is not capable of running in the high-performance mode, select Compatible mode in order to use the device in your computer.

Note: When you select Compatible mode for a controller, any device attached to it is affected by the reduction in function. For example, if you select Compatible mode to accommodate a slower drive attached to the same controller, a high-performance hard disk does not operate as efficiently as it would in High Performance mode.

Startup Options

The Startup Options section, on page 4 of the Configuration Utility program (see Figure 4-6 on page 4-19), displays the following type of information:

First, Second, Third, and Fourth Startup Device

Shows the current device for each step in the startup sequence. This function defines the order in which the computer looks for an operating system when it is started. You can have up to four devices in the startup sequence if you have that many devices installed in your computer. Use the right and left arrow keys to choose from a list similar to the following:

- Diskette Drive 0
- Hard Disk 0
- Hard Disk 1
- Network
- Disabled

Note: If you install a hard-disk drive, ensure that it is included in the startup options list; otherwise, you will not be able to boot your system from your hard-disk drive. To change the settings, use the arrow keys, as explained at the bottom of the screen.

Unattended Start Mode

Indicates if the computer is enabled to load the operating system and programs while keeping the attached keyboard and the 6-pin connector mouse port locked. Use the left and right arrow keys to choose between *Enabled* and *Disabled*. You might choose this mode of operation if you set up your computer as a network server. If the network loses power, the server can restart as soon as electric power is restored without waiting for the password.

Once you set unattended start mode, you need to do the following to activate your keyboard:

1. Press **Enter**.
2. Type your power-on password.
3. Press **Enter** again.

Power Management

Page 5 of the Configuration Utility program displays power management features, as shown in Figure 4-7.

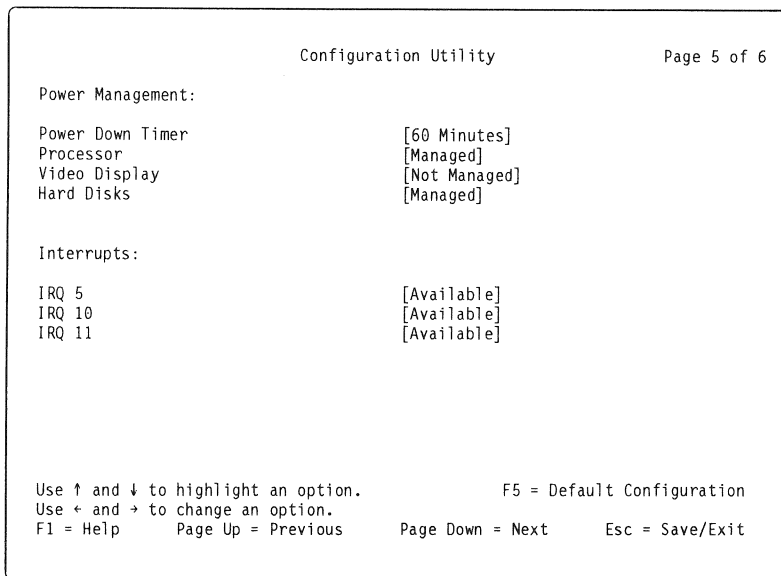


Figure 4-7. Sample Page 5 of the Configuration Utility Screens

- Power Down Timer** Displays the current time delay for computer inactivity before the system BIOS starts implementing power-saving measures. Use the right and left arrow keys to select the time delay that is most appropriate for you. If you change this option, your computer automatically restarts when you exit the Configuration Utility program.
- Processor** Indicates the status of the processor in the power management system. If you choose to include the processor among the managed devices, the system BIOS will slow the processing speed to the minimum required for the processor to detect a change in activity. Use the left and right arrow keys to choose either Managed or Unmanaged. If you change this option, your computer automatically restarts when you exit the Configuration Utility program.
- Video Display** Shows the options for power management of the display. Use the left and right arrow keys to choose either Managed or Unmanaged. If you change this option, your computer automatically restarts when you exit the Configuration Utility program.

Hard Disks

Indicates whether the hard disk drives (if applicable) are included in power management. Use the left and right arrow keys to choose Managed, Not Managed. If you change this option, your computer automatically restarts when you exit the Configuration Utility program.

Note: To prolong the life of hard disk drives, it a good idea to set the Power Down Timer setting for a **minimum** of 30 minutes. If you decide to select less than 30 minutes to initiate power management, change the Hard Disks selection to Not Managed.

Interrupts

Note

The following section of the Configuration Utility program is intended for advanced computer users.

Page 5 of the Configuration Utility program displays interrupt information, as shown in Figure 4-7 on page 4-22. The interrupt section displays whether the interrupt is being used by an ISA adapter or is available for use by another device. If you have an ISA adapter that uses one of the interrupts listed, change the selection to Used by ISA Adapter Card to reserve the interrupt assignment for the adapter. In this way, you can avoid conflicts when other devices automatically search for interrupts that are available for assignment.

Additional interrupt information is on page 4-34.

Memory Map

Note

The following section of the Configuration Utility program is intended for advanced computer users.

Page 6 of the Configuration Utility program (see Figure 4-8) provides information about the memory address space that is available in random-access memory (RAM). You can use this map to keep track of ISA adapter card's read-only memory (ROM) information being shadowed (copied) in RAM.

You can choose to make unassigned memory addresses available for use by adapter card buffers. It is important to use this section of the Configuration Utility program to designate any memory areas that can be used as adapter card buffer areas by your ISA adapters. After you assign memory areas for use by your adapter card buffers, these memory areas are protected and cannot be used by adapters such as PCI adapters, which automatically allocate their resources to any available memory locations.

When the information stored in ROM is shadowed in RAM, the microprocessor can retrieve the data faster than it could from the ROM on an ISA adapter card. The faster retrieval means that the overall performance of your computer improves.

```

Configuration Utility                               Page 6 of 6

Memory Map (C0000-DFFFF):

System Video BIOS at (C0000-C7FFF)   Shadowed
Memory Space at      (C8000-C9FFF)   Reserved for ROM or UMB
Memory Space at      (CA000-CBFFF)   Reserved for ROM or UMB
Memory Space at      (CC000-CDFFF)   Reserved for ROM or UMB
Memory Space at      (CE000-CFFFF)   Reserved for ROM or UMB
Memory Space at      (D0000-D1FFF)   [Available]
Memory Space at      (D2000-D3FFF)   [Available]
Memory Space at      (D4000-D5FFF)   [Available]
Memory Space at      (D6000-D7FFF)   [Available]
Memory Space at      (D8000-D9FFF)   [Available]
Memory Space at      (DA000-DBFFF)   [Available]
Memory Space at      (DC000-DDFFF)   [Available]
Memory Space at      (DE000-DFFFF)   [Available]

Internal Caching at  (C0000-CFFFF)   [Enabled]

Use ↑ and ↓ to highlight an option.           F5 = Default Configuration
Use ← and → to change an option.
F1 = Help                                     Page Down = Next     Esc = Save/Exit
    
```

Figure 4-8. Sample Page 6 of the Configuration Utility Screens

System Video BIOS at (C0000-C7FFF) Displays which video BIOS is active: System, ISA, or PCI. Both system and PCI BIOS are automatically shadowed in RAM.

Memory Space The Configuration Utility program detects the address range being used by adapter ROMs and makes memory space available in RAM. The memory map shows this ROM to be reserved. If the Configuration Utility program does not detect an adapter ROM for a given address range, then the memory map indicates that the address is available for use by other devices.

**Internal
Caching at
(C0000-CFFFF)**

Displays whether internal caching is Enabled or Disabled for the memory range C0000 to CFFFF. This area includes the first five memory ranges listed in the Memory Map:

C0000-C7FFF
C8000-C9FFF
CA000-CBFFF
CC000-CDFFF
CE000-CFFFF

If you have defined any of the fields in this range for Adapter Card Buffer, then Disabled appears in this field and cannot be changed. If you have not assigned any of these locations to Adapter Card Buffer selections, then the selection in this field is Enabled. If you want to place an Adapter Card Buffer assignment in this memory range, you can select Disabled in this field.

Note: The Disabled selection might reduce video performance.

If Enabled appears in this field, then all the first five memory ranges listed in the Memory Map are forced to become one of the following:

- Reserved for ROM
- Reserved for ROM or UMB

UMB (upper memory blocks) are areas of memory which are used by a DOS memory manager to store device drivers, terminate-and-stay-resident programs (TSRs), and similar types of operating system modules.

System Video BIOS (C0000 - C7FFF)

The first address shown in the Memory Map is dedicated to video BIOS. Both System and PCI BIOS are automatically shadowed in RAM. Shadowing the video BIOS in RAM increases overall system performance.

If an ISA video BIOS is detected, you can select [Shadowed] or [Not Shadowed] options. In most cases, it is an advantage to shadow video BIOS. If, however, you have disabled the video controller that is on your system board and installed an ISA video adapter, you might try selecting Not Shadowed if you find that your display is not working.

Internal Caching at (C0000-CFFFF)

This option appears at the bottom of Page 6, but its setting can affect a number of other memory locations and how they are used. You can select Enabled or Disabled to turn internal caching on or off.

Enabled Setting: When internal caching is set to Enabled, the first five memory locations in the Memory Map change as well. When you enable internal caching, the memory locations ranging from C0000 to CFFFF automatically change to Reserved for ROM or Reserved for ROM or UMB. The Configuration Utility program reserves the memory locations and you cannot change the assignments unless you disable internal caching.

Memory Address Pairs		Range Being Used or Not Used
C0000 - C7FFF	System Video BIOS	Shadowed
C8000 - C9FFF		Reserved for ROM
CA000 - CBFFF		Reserved for ROM
CC000 - CDFFF		Reserved for ROM
CE000 - CFFFF		Reserved for ROM

Disabled Setting: You can change internal caching by selecting the Disabled option using the right and left arrow keys.

When internal caching is set to Disabled, the first five memory locations in the Memory Map change as well.

Memory Address Pairs	Range Being Used or Not Used
C0000 - C7FFF System Video BIOS	Shadowed
C8000 - C9FFF Memory Space	[Available]
CA000 - CBFFF Memory Space	[Available]
CC000 - CDFFF Memory Space	[Available]
CE000 - CFFFF Memory Space	[Available]

Adapter Card ROM or Memory Space Available

The Configuration Utility program automatically designates a memory location as Adapter Card ROM space or as Memory Space Available. Although these are the only two possibilities in the left column on Page 6, there are a number of possible combinations on the right side. This section explores some of the most likely combinations and gives examples of how you might use them.

Memory Address Pairs	Range Being Used or Not Used
C0000 - C7FFF System Video BIOS	Shadowed
C8000 - C9FFF Memory Space Available	Adapter Card Buffer
CA000 - CBFFF Memory Space Available	Adapter Card Buffer
CC000 - CDFFF Adapter Card ROM	[Shadowed]
CE000 - CFFFF Memory Space	Reserved for ROM
D0000 - D1FFF Memory Space	Available
D2000 - D3FFF Memory Space	Available
D4000 - D5FFF Memory Space	Available
D6000 - D7FFF Memory Space	Available
D8000 - D9FFF Memory Space	Available
DA000 - DBFFF Memory Space	Available
DC000 - DDFFF Memory Space	Available
DE000 - DFFFF Memory Space	Available

The Memory Map locations work in pairs. In the case of a location that is labeled Adapter Card ROM by the Configuration Utility program, the adjacent memory space automatically becomes Reserved for ROM. In other words, a 16KB block of memory becomes protected space for the use of the ROM BIOS on one of your adapter cards. The documentation that came with each of your adapters has information about the memory addresses that are used by the adapter. Refer to this documentation if you want to know more precisely which adapter ROM is being shadowed at a given memory location.

Each memory location offers 8KB of space, with each pair offering 16KB. The memory allocations can be flexible. For example, if you have an adapter card ROM that requires 24KB of space, the Configuration Utility program might allocate memory space as represented in the following illustration.

Memory Address Pairs	Range Being Used
D0000 - D1FFF Memory Space	Reserved for ROM
D2000 - D3FFF Adapter Card ROM	[Shadowed]
D4000 - D5FFF Adapter Card ROM	[Shadowed]
D6000 - D7FFF Adapter Card ROM	[Shadowed]
D8000 - D9FFF Memory Space	[Available]
DA000 - DBFFF Memory Space	[Available]

In this example, the memory allocation begins at D2000 - D3FFF and continues into the next pair (D4000 - D5FFF and D6000 - D7FFF). With three 8KB areas allocated, the adapter card ROM occupies a total of 24KB in memory addresses.

You might have an adapter card ROM that requires only 2KB of memory space; the entire 8KB memory is allocated even though less is actually required. In the following example, memory location CE000 - CFFFF is set aside for an adapter card ROM. The adjacent memory location in the pair automatically reads Reserved for ROM.

If you change the selection in the second 8KB to Not Shadowed then the first 8KB range changes to Available.

Memory Address Pairs	Range Being Used or Not Used
C0000 - C7FFF System Video BIOS	Shadowed
C8000 - C9FFF Memory Space	[Available]
CA000 - CBFFF Memory Space	[Available]
CC000 - CDFFF Memory Space	Reserved for ROM
CE000 - CFFFF Adapter Card ROM	[Shadowed]
D0000 - D1FFF Memory Space	[Available]
D2000 - D3FFF Memory Space	[Available]

If the Configuration Utility program does not detect the presence of an adapter card ROM for a given memory location, then it labels the space Memory Space at...[Available].

Memory Address Pairs	Range Being Used or Not Used
C0000 - C7FFF System Video BIOS	Shadowed
C8000 - C9FFF Memory Space	[Available]
CA000 - CBFFF Memory Space	[Available]
CC000 - CDFFF Memory Space	[Available]
CE000 - CFFFF Memory Space	[Available]

If you have an adapter card that uses a memory range for buffer activities, you can select the correct available memory location.

You can change the field from Available to another selection, such as [Adapter Card Buffer]. The following illustration shows how memory might be allocated if you changed memory location CC000 - CFFFF which was Available in the previous illustration.

Memory Address Pairs	Range Being Used or Not Used
C0000 - C7FFF System Video BIOS	Shadowed
C8000 - C9FFF Memory Space	[Available]
CA000 - CBFFF Memory Space	[Available]
CC000 - CFFFF Memory Space	[Adapter Card Buffer]
CE000 - CFFFF Memory Space	[Available]

Adapter Card Buffer assignments do not require a whole 16KB block like Adapter Card ROM assignments do, so the adjacent memory location in the pair is still open for assignment.

Date and Time Settings

Your computer has an internal clock that maintains the date and time. A memory-retention battery keeps the clock active when you turn off the computer.

You can set the date and time in two ways:

- Through the operating system (see your operating-system documentation for details)
- Through the Configuration Utility program

To set the clock through the Configuration Utility program, see "Clock" on page 4-16.

Device Drivers

Device drivers are programs that support a specific type of hardware device, such as a printer. They provide instructions that allow the computer to interact with the device or take advantage of the special features of the device. The drivers might be included with your operating system or application programs. Hardware options also might include a diskette that contains the device drivers you need to make the options work.

Device drivers fall into two general categories:

- Device-specific
- Application-specific

Device-specific drivers load into memory each time you turn on the computer. The CONFIG.SYS file contains the statements that control them. Some drivers check for the presence of a device each time you turn on the computer. If the device it supports is not attached or not turned on, the driver does not load and might generate an error message. Once loaded, device-specific drivers stay in memory.

Application programs load application-specific drivers into memory. These drivers stay in memory while the application is running, and they generally clear from memory when you exit from the application. For more information about the CONFIG.SYS file, refer to your operating-system documentation, and the documentation that comes with your hardware or device drivers.

Diskette Write-Protect Feature

The diskette write-protect feature is controlled by the Diskette Write-Protect jumper, located on your system board. This jumper can be reset to prevent the writing of data to the diskette drive. The default setting for this jumper allows both reading from and writing to the diskette drives.

If you change the jumper's default setting, the diskette drives can read information from diskettes, but they cannot write information to them. This prevents information on a hard disk or network from being copied to a diskette. This jumper does not affect the capability to read information that is on a diskette.

For instructions on changing jumper positions, see "Changing Jumper Positions" on page 4-35.

Interrupt and DMA Assignments

Table 4-1 and Table 4-2 outline the interrupt request assignments and direct memory access (DMA) channel assignments for your computer. If you install industry-standard architecture (ISA)-bus adapters in your computer, be sure that no interrupts or DMA channels conflict with existing resources. For example, do not set an ISA adapter to use interrupt (IRQ) 14 because IRQ14 is used by the IDE hard disk drive.

Interrupt Request Assignments

The following table outlines the interrupt request assignments.

<i>Table 4-1. Interrupt Request Assignments</i>	
Interrupt Request	System Resource
NMI	Parity error or channel check
0	Reserved (interval timer)
1	Reserved (keyboard buffer full)
2	Reserved (cascade interrupt from slave PIC)
3	Serial port 2
4	Serial port 1
5	Available (parallel port 2, or can be used by either AT- or PCI-bus adapters – see note)
6	Diskette drive
7	Parallel port 1
8	Real-time clock
9	Available (can be used by either AT- or PCI-bus adapters – see note)
10	Available (can be used by either AT- or PCI-bus adapters – see note)
11	Available (can be used by either AT- or PCI-bus adapters – see note)
12	Mouse port, if enabled; otherwise, it is available
13	Reserved (math coprocessor)
14	IDE hard disk drives
15	Alternate IDE hard disk drives

Note: NMI is the abbreviation for *non-maskable interrupt*. PIC is the abbreviation for *programmable interrupt controller*.

For interrupts 5, 9, 10, and 11, at least one must be available for PCI adapters if any PCI adapters are installed. Interrupt 9 can be used as the vertical retrace interrupt by some software, so it might not always be available.

DMA Channel Assignments

The following table outlines the DMA channel assignments.

<i>Table 4-2. DMA Channel Assignments</i>		
DMA Channel	Data Width	System Resource
0	8 bits	Available
1	8 bits	Available
2	8 bits	Reserved (diskette drive)
3	8 bits	Available (used by parallel port when in extended capabilities, ECP, mode)
4		Reserved (cascade channel)
5	16 bits	Available
6	16 bits	Available
7	16 bits	Available

Jumpers

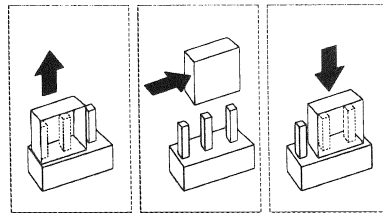
Jumpers are located on the system board and can help you to customize the way your computer operates. Location and description information for the system board jumpers start on page 4-36.

Changing Jumper Positions

Each jumper covers two of three pins on a pin block, a jumper is positioned either toward the top or toward the bottom of the card. On the system board, a jumper is positioned either toward the front or toward the rear of the computer.

To change a jumper's position:

1. Power-off the computer and all attached devices.
2. Unplug all power cords and cables connected to the computer.
3. Remove the computer cover.
4. Remove any feature cards or drives necessary to access the jumper to be changed.
5. Locate the desired jumper. The locations of the jumpers are shown on page 4-36.
6. Remove any components that are blocking access to the jumper.
7. Pull the jumper straight up to remove it from the pin block; align the holes in the bottom of the jumper with the center pin and with the pin that was not covered previously; then carefully slide the jumper fully down onto the two pins.



Notes:

- a. The jumper covers two of the three pins on the pin block.
- b. The microprocessor-voltage jumper block (5V/3V, item 5 in Figure 4-9 on page 4-36) is different from the other jumpers on the system board. This jumper block is always present.
8. Reinstall any components that were removed.
9. Reinstall the computer cover.
10. Reconnect all power cords and cables to the computer system.

System Board Jumpers

Figure 4-9 shows the location of each jumper on the system board, followed by a description of each. The jumper settings are imprinted on the system board next to the respective jumpers.

Note: Power-off the computer and unplug the power cord from the electrical outlet before moving any jumpers. For instructions on changing the jumper positions, see "Changing Jumper Positions" on page 4-35.

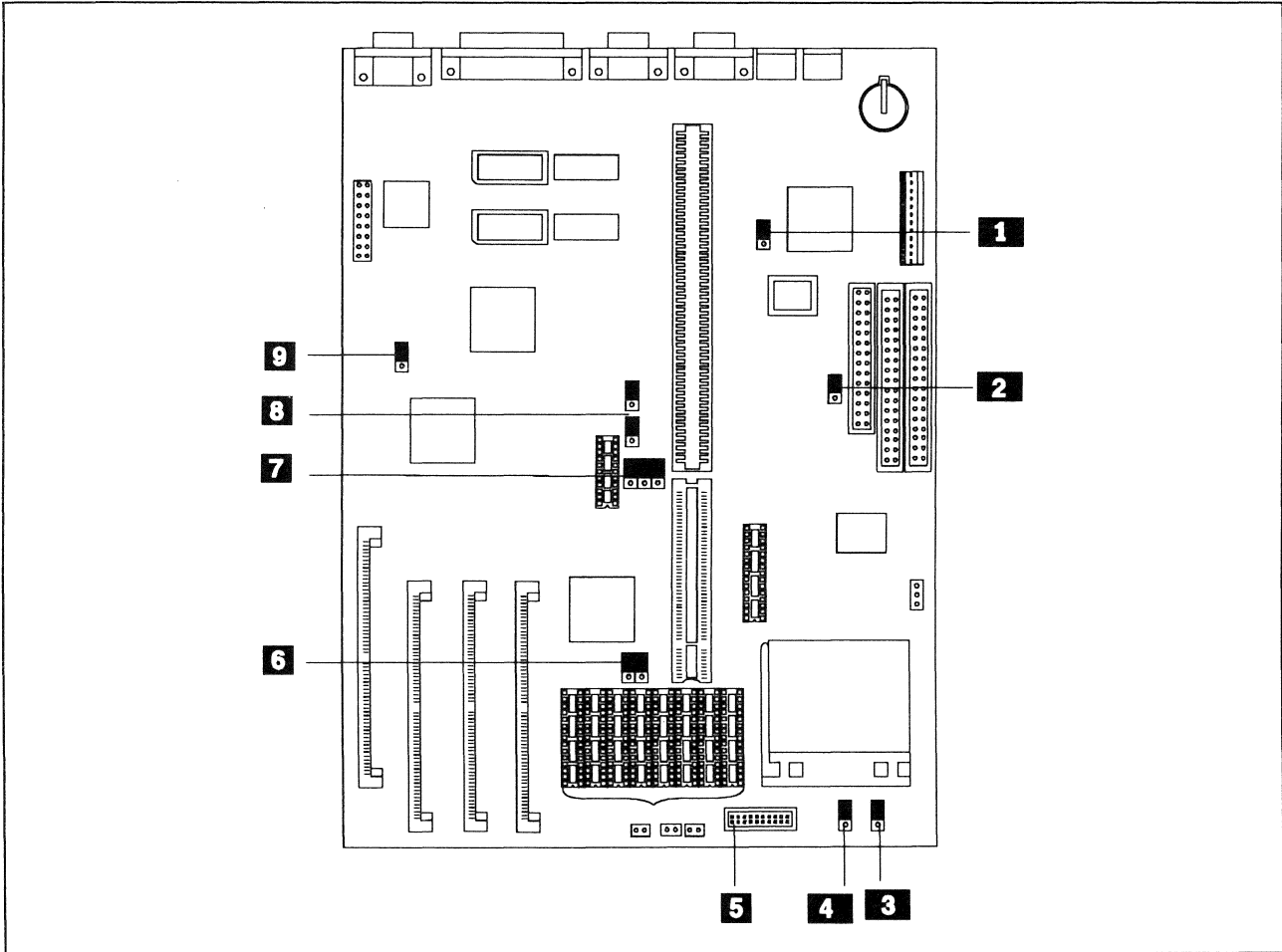


Figure 4-9. System Board Jumper Locations

- 1 IRQ12 — Mouse-Disable jumper
 - To enable the use of the mouse port, move the jumper to the rear position.
 - To disable the use of the mouse port, move the jumper to the position nearest the front of the computer. This allows IRQ12 to be used on the AT bus.

Note: A serial mouse is not affected by the setting of this jumper.
- 2 WRITE PROTECT — Diskette Write-Protect jumper
 - To prevent writing to a diskette, move the jumper to the position nearest the front of the computer.
 - To allow writing to a diskette, move the jumper to the rear position.

- 3 SL-ENHANCED / NON-SL — Microprocessor-SL jumper
 - Use the SL-ENHANCED position toward the rear of the computer if you install an SL-enhanced microprocessor in the processor-upgrade socket.
 - Use the NON-SL position toward the front of the computer if you install in the microprocessor-upgrade socket a microprocessor that is not SL-enhanced.

Note: Make sure you know what type of microprocessor (SL-enhanced or non-SL) you have installed. If this jumper is in the wrong position, the microprocessor will not work.
- 4 486SX/DX/DX2/DX4/P24T — Microprocessor-Upgrade jumper
 - Use the 486SX position if you have a 486SX microprocessor installed in the processor socket.
 - Use the DX/DX2/DX4 position if you install an 486DX, 486DX2, or 486DX4 microprocessor in the processor socket.
- 5 5V/3V — Microprocessor-Voltage jumper
 - Your computer comes with this jumper installed.
- 6 128KB/256KB — Cache-Select jumpers
 - Use the 128KB position for both jumpers if 128KB of external cache is installed.
 - Use the 256KB position for both jumpers if 256KB of external cache is installed.
- 7 VESA/PCI — Riser-Select jumpers
 - Use the VESA position for these jumpers when a riser with VESA-bus capabilities is installed.
 - Use the PCI position for these jumpers when a riser with PCI-bus capabilities is installed.

Note: Your computer comes with this jumper set to VESA.
- 8 25/33/40/50 MHz — Microprocessor-Speed jumpers
 - Use the appropriate microprocessor clock speed for the microprocessor you have installed. The following table shows the correct jumper positions.

Note: The *front jumper* is the jumper nearest the front of the computer.

Speed (MHz)	Jumper		80486 SX-25	80486 SX-33	80486 SX2-50	80486 DX-33	80486 DX2-50	80486 DX2-66	80486 DX4-100
	Rear	Front							
25			X		X		X		
33				X		X		X	
40									
50									X

= Jumper Position

- 9 ENABLE/DISABLE — Video-Adapter jumper
 - Use the ENABLE position to enable the video controller on the system board.
 - Use the DISABLE position to disable the video controller on the system board and permit use of a video adapter.

Memory-Retention Battery

The computer has a special type of memory that maintains the date, time, and settings for built-in features. The memory-retention battery, located on the system board, keeps this information active when the computer is powered off. This battery requires no charging or maintenance throughout its life, but it might need to be replaced at some point in time.

If the memory-retention battery fails, the following message appears on the display screen when the computer is powered on:

The following error(s) were detected when the system was started.

161 Bad CMOS Battery

Press Enter to run the Configuration Utility Program or Esc to continue.

You might see other error codes displayed after the 161 error.

If you need to replace the battery, refer to "Memory Retention Battery" on page 7-9.

Parallel Port

The parallel port is most often used to communicate with a parallel printer; however, parallel communication is an effective method of communicating with a variety of parallel devices.

The parallel port can send and receive data 8 bits at a time, as opposed to the serial port, which sends and receives 1 bit at a time. Although the parallel port has 25 pins, only 8 of them are used to transfer data; the rest are used for control or status functions, and grounding.

Your computer has one parallel port as a standard, built-in feature. You can increase the number of parallel ports by installing a parallel adapter in one of the computer expansion slots.

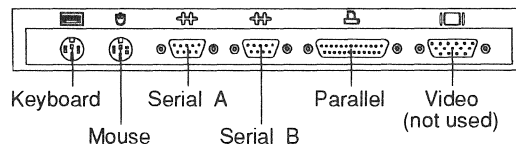
Parallel-Port Assignments: Software distinguishes one parallel port from another by the parallel-port assignment. Most adapters that provide parallel communication use jumpers or switches to set the parallel-port I/O address assignment. No two parallel ports can be set the same. You can change the assignment of the built-in parallel port by using the Configuration Utility program. You can set the built-in parallel port to any of the following settings:

- 3BC – IRQ7
- 378 – IRQ5
- 378 – IRQ7
- 278 – IRQ5
- Disabled

It is set as 3BC – IRQ7 at the time of shipment.

Many operating systems and application programs have a setup program that defines the location of the printer and the type of printer attached. Many use "LPT" (for line printer) to refer to the parallel ports. The Configuration Utility program identifies which LPT name is assigned to the system parallel port. For example, the system parallel port might be assigned LPT1.

Installing an External Parallel Device: Adding an external device to your computer requires the use a parallel cable (purchased separately). Follow these steps to complete the installation:



1. Plug one end of the parallel cable into the parallel port on the back of the computer.
2. Plug the other end of the parallel cable into the external device. (If the parallel cable does not fit, you may need to purchase a cable adapter.)
3. Make any adjustments or add any features needed to operate the device. For example, your external device may require additional software or special settings. For detailed requirements, read the installation instructions that came with the external device.
4. To change the parallel port settings for your computer, refer to page 4-40.

Viewing the Parallel-Port Assignment: To view the parallel port:

1. Access the Configuration Utility program. (See the procedure on page 4-11 if you need assistance.)
2. Press **Page Down** to view Page 3 of 6 and look up the parallel port setting under Input/Output Ports.
3. Press **Esc** to exit from the Configuration Utility program.

Configuration Utility		Page 3 of 6
Keyboard and Mouse:		
Keyboard Speed		[Normal]
Keyboard NumLock State		[On]
Keyboardless Operation Mode		[Disabled]
Mouse		Installed
Input/Output Ports:		
Serial Port A		[3F8-IRQ4] COM1
Serial Port B		[2F8-IRQ3] COM2
Parallel Port		[3BC-IRQ7] LPT1
Parallel Port Mode		[PC/AT (Compatible)]
Cache:		
Internal Cache		8 KB [Enabled]
External Cache		Not Installed
Use ↑ and ↓ to highlight an option.		F5 = Default Configuration
Use ← and → to change an option.		
F1 = Help	Page Down = Next	Esc = Save/Exit

Changing the Parallel-Port Assignment: To change the parallel-port assignment:

1. Access the Configuration Utility program. (See the procedure on page 4-11 if you need assistance.)
2. Press **Page Down** to view Page 3 of 6 and look up the parallel port setting under Input/Output Ports.
3. Use the up arrow and down arrow keys (↑ and ↓) to highlight the parallel port setting.
4. Use the left arrow and right arrow keys (← and →) to change the setting in this field. If the parallel-port assignment conflicts with another assignment, the word CONFLICT appears next to the conflicting setting. You must change one of the conflicting settings to a nonconflicting value.
5. Press **Esc** to exit from the Configuration Utility program and save your changes.

You can also disable the parallel port if you want to prevent unauthorized transmission of data to any attached parallel device, such as a printer or external tape drive. Use the left arrow and right arrow keys (← and →) to select the Disabled setting in the parallel port field.

Changing the Parallel-Port Mode: The parallel port can operate in five different modes, one is a write-only mode, the other four are bidirectional because they allow the port to perform both reading and writing functions.

- **PC/AT compatible**

In this mode, the parallel port is limited to writing information to the device attached to it. You would choose this mode for a parallel printer connection. This mode is the default setting for the Configuration Utility.

- **PS/2**

This bidirectional mode enables data transfer to other PC systems and supported parallel-port security devices.

- **ECP** (extended capabilities mode) is a protocol enhancement for high-performance printers. New printers that take advantage of this mode indicate ECP support in their documentation.

- **EPP 1.7** and **EPP 1.9** (enhanced parallel port)

Note: If you select either **EPP 1.7** or **EPP 1.9** as the mode setting, you have four (rather than five) possible address and interrupt choices. Address and interrupt selection 3BC – IRQ7 is not available for these modes.

Both mode settings are industry-standard, high-performance, bidirectional modes. These modes provide higher performance than the PS/2 mode and allow the attachment of communication devices (modem and LAN adapters) in addition to printers.

You can set five different modes of operation for the parallel port using the Configuration Utility program. To change the parallel-port assignment:

1. Access the Configuration Utility program. (See the procedure on page 4-11 if you need assistance.)
2. Press **Page Down** to view Page 3 of 6 and look up the parallel port mode setting under Input/Output Ports:.
3. Use the up arrow and down arrow keys (↑ and ↓) to highlight the parallel port mode setting.
4. Use the left arrow and right arrow keys (← and →) to change the setting in this field.
5. Press **Esc** to exit from the Configuration Utility program and save your changes.

If you change this option, your computer automatically restarts when you exit the Configuration Utility program.

Passwords

The following two types of passwords can optionally be set to help protect your computer:

- Power-on password
- Administrator password

The following is true for all of the passwords:

- You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for the passwords. Keep a record of your passwords in a secure place.
- The password does not appear on the screen when entered. If you enter an incorrect password, a screen message or symbol appears to indicate that you entered an incorrect password.

The following is true for the power-on and administrator passwords: if you enter an incorrect power-on or administrator password three times, you must turn off the computer and start again.

Power-On Password

The power-on password locks the keyboard and mouse to help prevent unauthorized use of your computer.

To set, change, or disable a power-on password, use the Configuration Utility program, as explained on page 4-15. To remove a forgotten power-on password, refer to “Power-On or Administrator Password” on page 4-43.

When a power-on password is set, a password prompt appears each time you turn on the computer. Before you can use the computer, you must type the correct password.

Administrator Password

The administrator password restricts access to the Configuration Utility program. To set, change, or disable an administrator password, use the Configuration Utility program, as explained on page 4-15. To remove a forgotten administrator password, refer to “Power-On or Administrator Password” on page 4-43.

When an administrator password is set, a password prompt appears each time **F1** is pressed to access the Configuration Utility program. If a configuration error panel appears when the computer is powered on, you are prompted to press **Enter** to access the Configuration Utility program; then the administrator password prompt appears on the screen. Before you can use the Configuration Utility program, you must type the correct password.

Removing a Forgotten Password

Power-On or Administrator Password: To remove a forgotten power-on or administrator password, you must remove the memory-retention battery for 15 minutes. For instructions on removing the battery, refer to "Memory Retention Battery" on page 7-9.

After you remove the battery all configuration settings are lost and the Configuration Utility program automatically resets all information to the default (factory) settings.

If you must remove the battery, be sure to access the Configuration Utility program the next time you turn on the computer to reselect the configuration settings you want.

Serial Port

You can use the serial ports to add *external devices*, such as a plotter, scanner, external modem, or serial printer. The serial ports provide an effective way of communicating with a variety of serial devices. You also can use it to set up communications between two computers using a null modem, or over telephone lines using a modem.

The serial port sends and receives data 1 bit at a time, as opposed to the parallel port, which sends and receives 8 bits at a time. The serial port can transmit data at speeds ranging from 300 to 19.6K bits per second. The bits-per-second measurement is commonly referred to as the *baud rate*.

Your computer has two 9-pin serial ports: A and B. Both Serial Port A and Serial Port B are 16550A-compatible connections.

You can add another serial port by installing a serial adapter in one of the available expansion slots.

Serial-Port Assignments: Software distinguishes Serial Port A from Serial Port B by the serial-port I/O address assignment. No two serial ports can be set the same. Most adapters that provide serial communications use jumpers or switches to set the serial-port I/O address assignment.

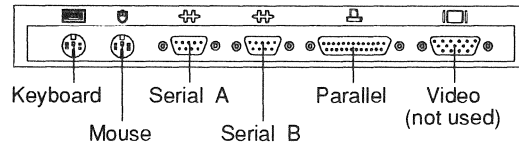
You can change the assignment of the built-in serial ports by using the Configuration Utility program. You can set the serial ports to any of the following settings:

- 3F8 – IRQ4
- 2F8 – IRQ3
- 3E8 – IRQ4
- 2E8 – IRQ3
- Disabled

The serial ports are set to 3F8 – IRQ4 and 2F8 – IRQ3 at the time of shipment.

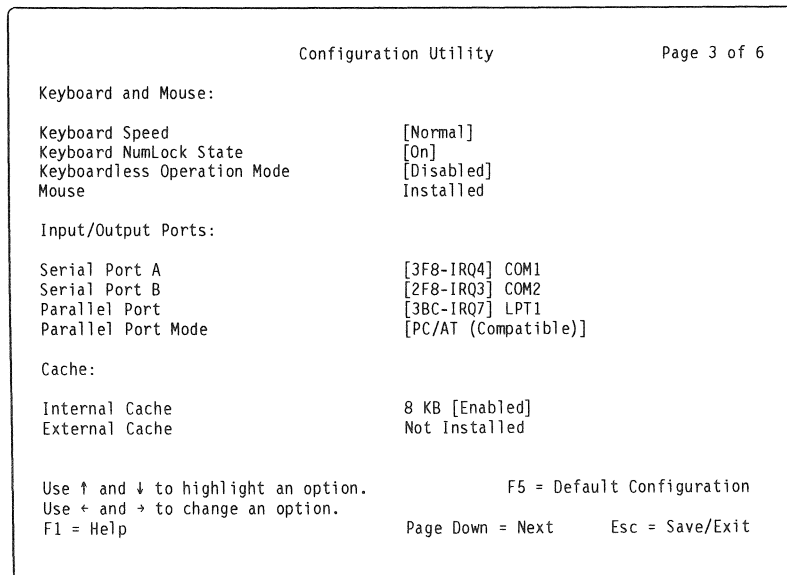
Many operating systems and application programs have a setup program that defines the location and speed (baud rate) of a modem, or the location and type of serial printer. Many use "COM" (short for "Communications") to refer to the serial ports. For example, COM1 might be assigned to I/O address 3F8 – IRQ4. If you are not sure of your serial-port assignment, use the Configuration Utility program to view it.

Installing an External Serial Device: Adding an external device to your computer requires the use of a serial cable (purchased separately). Use Serial Port A for high-speed modem and printer connections, or for devices such as a mouse or other pointing device. Follow these steps to complete the installation:



1. Plug one end of the serial cable into Serial Port A.
2. Plug the other end of the serial cable into the external device. (If the serial cable does not fit, you may need to purchase a cable adapter.)
3. Make any adjustments or add any features needed to operate the device. For example, your external device may require additional software or special settings. For detailed requirements, read the installation instructions that came with the external device.
4. To change the serial port settings for your computer, refer to page 4-46.

Viewing the Serial-Port Assignments



To view the serial-port assignment:

1. Access the Configuration Utility program. (See the procedure on page 4-11 if you need assistance.)
2. Press **Page Down** until you see Page 3 of 6.

The serial ports are listed on the screen under Input/Output Ports.

Changing the Serial-Port Assignments

Configuration Utility		Page 3 of 6
Keyboard and Mouse:		
Keyboard Speed	[Fast]	
Keyboard NumLock State	[On]	
Keyboardless Operation Mode	[Enabled]	
Mouse	Installed	
Input/Output Ports:		
Serial Port A	[3F8-IRQ4] COM1	
Serial Port B	[2F8-IRQ3] COM2	
Parallel Port	[3BC-IRQ7] LPT1	
Parallel Port Mode	[ECP (Bidirectional)]	
Cache:		
Internal Cache	8 KB [Disabled]	
External Cache	128 KB [Enabled]	
Use ↑ and ↓ to highlight an option.		F5 = Default Configuration
Use ← and → to change an option.		
F1 = Help	Page Down = Next	Esc = Save/Exit

To change the serial-port assignment:

1. Access the Configuration Utility program. (See the procedure on page 4-11 if you need assistance.)
2. Press **Page Down** to view Page 3 of 6 and look up the serial port settings under Input/Output Ports.
3. Use the up arrow and down arrow keys (↑ and ↓) to highlight one of the two serial port settings.
4. Use the left arrow and right arrow keys (← and →) to change the setting in this field. If the serial-port assignment conflicts with another assignment, the word **CONFLICT** appears next to the conflicting setting. You must change one of the conflicting settings to a nonconflicting value.
5. Press **Esc** to exit from the Configuration Utility program and save your changes.

You can also disable each serial port if you want to prevent unauthorized transmission of data to any attached serial device, such as an external modem or serial printer.

Use the left arrow and right arrow keys (← and →) to select the Disabled setting in each serial port field.

SVGA Video

Your computer supports both SVGA (super video graphics array) and VGA (video graphics array) levels of resolution. SVGA is a video standard that displays high-resolution, 1024x768 graphic images. With 1MB of video memory standard, you can view the following super graphics modes:

- Up to 16 colors simultaneously at 1280x1024 resolution
- Up to 256 colors simultaneously at 1024x768, 800x600, or 640x480 resolution
- Up to 65536 fixed colors at 800x600 and 640x480 resolution
- Up to 16.7M colors at 640x480 resolution

The SVGA video also is fully compatible with all standard VGA modes.

Advantages of Using SVGA

The SVGA video controller provides easy-to-read text and graphics at new levels of performance. With the new fast-refresh noninterlaced displays, you'll find flicker and jitter a thing of the past.

The SVGA controller provides excellent on-screen performance, and uses its local bus capabilities to process tasks, thereby freeing up the system microprocessor for other tasks. This provides better overall system performance.

Software Compatibility with SVGA

The SVGA video controller can display application programs written for any of the following video standards:

Standard	Resolution	Colors
MGA (Monochrome Graphics Adapter)	720x350	----
CGA (Color Graphics Adapter)	320x200	4
EGA (Enhanced Graphics Adapter)	640x350	16
MCGA (Multicolor Graphics Array)	320x200	256
	640x480	2
VGA (Video Graphics Array)	640x480	256
SVGA (Super Video Graphics Array)	640x480	16777216
	800x600	65536
	1024x768	256
	1280x1024	256

Some application programs require video device drivers to use the super-graphics modes. The device-driver package shipped with your computer provides device drivers for some application programs and operating systems that do not have SVGA support built in. Refer to the device-driver package for installation instructions and additional information about the individual drivers.

Some application programs provide their own video device drivers to take advantage of SVGA modes. These device drivers are installed through a setup program built into the application program. Setting up these applications to operate in the super video modes can be confusing, because terminology for these modes has

not been standardized throughout the industry. Some terms commonly used in application programs to describe the super video-graphics modes include:

- High resolution
- Super VGA or SVGA
- Extended VGA or EVGA
- 1024x768

Terms like *high resolution*, *super VGA*, *extended VGA*, may or may not have the same meaning as *1024x768*. If you find these terms used by your application program, refer to the documentation that came with the program for additional information.

Display Support

The SVGA controller provides support for a wide variety of displays. The following list describes the categories of supported displays.

- 640x480, 72 Hz, noninterlaced displays
- 1024x768, 70 Hz, noninterlaced displays
- 60 Hz, noninterlaced displays

Video Configuration

You can view the current settings for your video features on Page 1 of the Configuration Utility program. The information identifies your current video controller and the amount of usable video memory you have available.

```

                                Configuration Utility                                Page 1 of 6

System Information:

Processor                        80486DX2
Processor Speed                  66 MHz
Math Coprocessor                 Installed
System Memory                   4096 KB
Flash EEPROM Revision Level     LDET01AUS

Video:

Video Controller                 S3, Inc.
Video Memory                    1024 KB
Video BIOS Location             C0000-C7FFF
Video Monitor Type              [User Defined]
Horizontal Frequency             [38.0 - 48.9 KHz]
Refresh Rate for (640x480)     [70 Hz]
Refresh Rate for (800x600)     [60 Hz]
Refresh Rate for (1024x768)    [60 Hz]
Refresh Rate for (1280x1024)   [60 Hz]

Use ↑ and ↓ to highlight an option.          F5 = Default Configuration
Use ← and → to change an option.
F1 = Help                                     Page Down = Next      Esc = Save/Exit

```

You can check the amount of video memory available by accessing Page 1 of the Configuration Utility program.

Adding Video Memory

Your computer comes with 1 MB of video memory already installed. Many application programs use the 1MB of *dynamic random access memory* (DRAM) to display high-resolution, multicolor images. The video function provided by most programs works within 64KB blocks, which are *paged* or *swapped* in and out of the 1MB DRAM workspace.

You can have a total of 2MB of video memory by installing a pair of video memory modules that provide the additional 1 MB of memory. The additional memory can make it possible for your display to show higher resolution images and a greater variety of colors, as long as the display itself has high resolution capabilities. Refer to your &expand. booklet for more information and instructions.

Special Characters and Languages

The SVGA video controller can display a variety of characters and languages. The language that is supported depends on the *code page* loaded by your operating system. Following is a list of supported code pages:

Language	Code Page
Multilingual	437
Multilingual	850
Portuguese	860
Canadian French	863
Nordic	865
Russian	982

You can find additional information about code pages in your operating-system documentation.

System Programs

The system programs contain the power-on self-test (POST) routines and the Basic Input/Output System (BIOS) instructions. These programs are contained in *flash EEPROM* modules on the system board.

Traditionally, the POST routines and BIOS instructions have been contained in read-only memory (ROM) modules. If you wanted to update BIOS instructions and POST routines, you had to disassemble the computer and replace modules, or replace the system board. Now, the flash EEPROM modules have replaced the ROM modules. This allows you to easily update the BIOS and POST information from updated files provided on a diskette.

Updating the Flash EEPROMs

As part of the continuing work to improve quality, IBM might make changes and enhancements to the POST routines and BIOS instructions that are on the system board.

System Board Flash EEPROM: If updates are required for the system board flash EEPROM, updated versions of the system programs will be made available on an Update diskette. Complete instructions will be provided with that diskette.

Verifying the Flash EEPROM Revision Level: You can verify the flash EEPROM update for the system board by accessing the Configuration Utility program. Check to see if the revision level on the screen matches the revision level of the Update Diskette you just used.

```

                                Configuration Utility                                Page 1 of 6

System Information:

Processor                        80486DX2
Processor Speed                   66 MHz
Math Coprocessor                  Installed
System Memory                    4096 KB
Flash EEPROM Revision Level      LDET46AUS

Video:

Video Controller                  S3 Incorporated, Vision864
Video Memory                      1024 KB
Video Display Type                [User Defined]
Horizontal Frequency              [38.0 - 48.9 KHz]
Refresh Rate for (640x480)        [75 Hz]
Refresh Rate for (800x600)        [72 Hz]
Refresh Rate for (1024x768)       [60 Hz]
Refresh Rate for (1280x1024)      [45 Hz] Interlaced
Refresh Rate for (1600x1200)      [43 Hz] Interlaced

Use ↑ and ↓ to highlight an option.          F5 = Default Configuration
Use ← and → to change an option.
F1 = Help                                     Page Down = Next      Esc = Save/Exit


```

For information about starting the Configuration Utility program, refer to "Accessing the Configuration Utility Program" on page 4-11.

The Configuration Utility Program

The Configuration Utility program lets you view and change important information about your computer's hardware. Also, it displays text messages describing POST errors. (For detailed information about using the Configuration Utility, refer to "Configuration Utility" on page 4-8.)

You can access the Configuration Utility program by:

- Pressing **F1** when the Configuration Utility program symbol  is in the top-right corner of the screen during memory count. (For detailed information about using the Configuration Utility, refer to "Configuration Utility" on page 4-8.)
- Pressing **Enter** from a POST error panel.

If your Configuration Utility program normally displays in your native language, but then displays in English or a language other than your own, call for service.

The Diagnostic Programs

Your 7585 Industrial Computer came with a PS/ValuePoint Diagnostics Type 5 diskette, which contains the hardware diagnostic programs. Use this diskette when you suspect a hardware failure. This program requires minimal interaction from you. You can use it to test the base computer, as well as the keyboard and some external devices.

Troubleshooting Charts

The troubleshooting charts list symptoms of problems (such as "The mouse is not working."), as well as steps to correct the problem.

Error Messages

Error messages that appear on the screen might be text, numeric, or both. There are three types of error messages:

- POST error messages

Messages that appear if POST finds a problem.

- Diagnostic error messages

Messages that appear if a problem is detected by the test program.

- Software-generated error messages

Messages that appear if a problem or conflict is detected by the application program, the operating system, or both. For an explanation of these messages, refer to the information that came with the software package.

Testing the Computer

The test programs are designed to test *IBM* products only. Non-IBM products might present misleading error messages or unexpected computer responses. If you want to test a non-IBM product, refer to the information that came with the product.

If the computer does not start when you press the power switch, do the following:

- Make sure all cables are securely connected to the correct locations.
- Check to see if the voltage-selection switch is set to the correct position.


Starting the Computer

You will be listening for a beep during this procedure.

Note: For the following procedure, if the Enter password message appears on the screen, a power-on password is set. Type the correct password; then press **Enter** to continue.

1. Turn on all external devices, and turn on the computer. Watch the screen, and listen for a beep. Numbers indicating the amount of base memory and extended memory appear in the top-left corner of the screen. The computer is running POST.

Note: The amount of available memory shown might be less than expected because of BIOS shadowing in RAM.

The Configuration Utility program symbol  appears in the top-right corner of the screen.

- If POST finishes without detecting an error, you hear one beep and the first screen of your operating system or application program appears.
 - If POST detects an error, you hear multiple beeps or no beep, and an error code and a description of the error appear. Press **Enter** to access the Configuration Utility program.
 - If there is no beep, have the computer serviced.
2. Find your computer response in the following table; then go to the section specified.

Computer Response	Go to:
Application program or operating system appears.	"Starting the Diskette-Based Diagnostic Program" on page 5-5.
Blank screen, unreadable screen, or other response.	"Troubleshooting Charts" on page 5-6.
POST error code or message appears.	"Error Messages" on page 5-13.

System Board Components

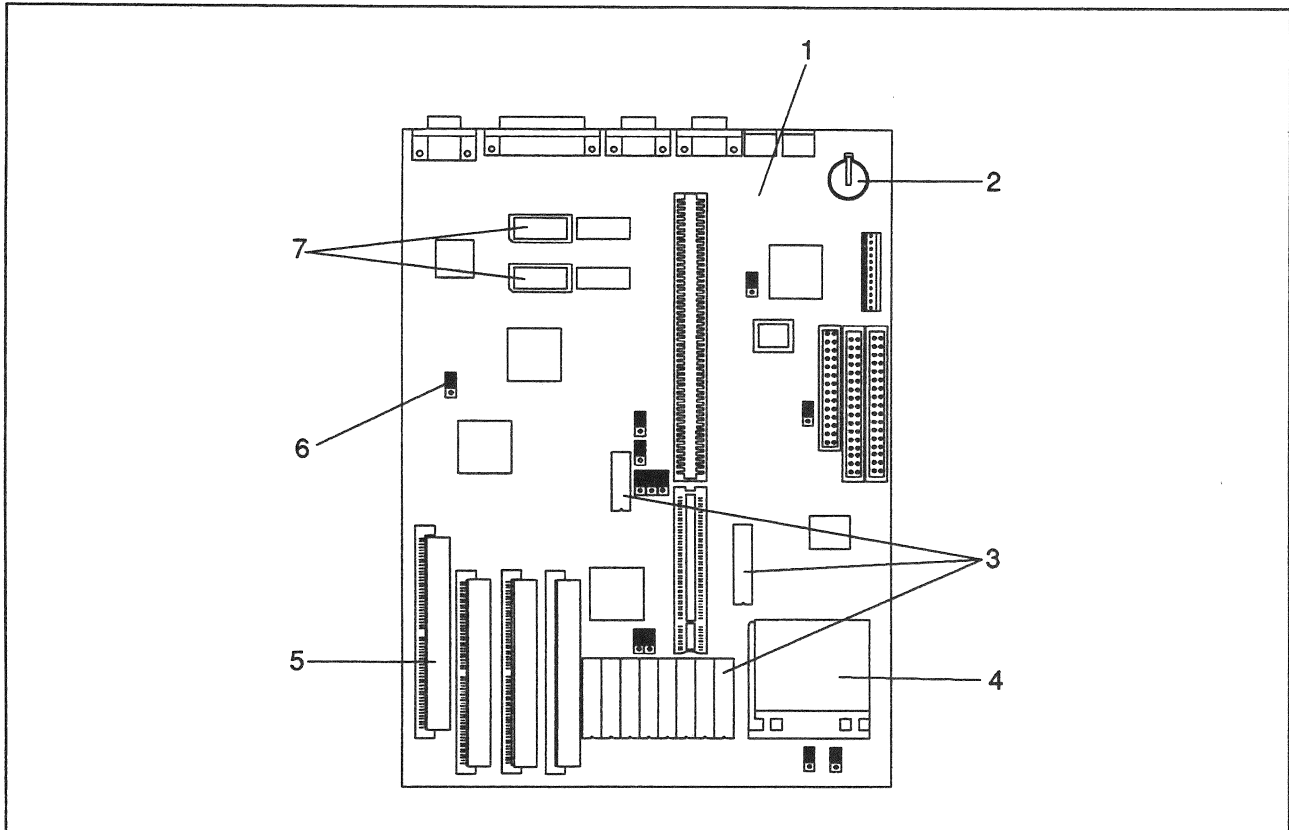


Figure 8-8. System board components

Figure Index Number	FRU Part Number	FRU Description
1	82G2397	System board (includes no memory or processor)
2	33F8354	Battery (lithium), memory retention
3	— 92G7430 92G7431	External cache memory kit 128KB (six modules) 256KB (ten modules)
4	— 71G0791 71G0795 06H4824	Processor 486SX-33 486DX2-66Mhz 486DX4-100Mhz (includes voltage regulator)
5	— 73G3233 73G3234 60G2950 73G3135	RAM memory module (SIMM), 70 nsec 4MB 8MB 16MB 32MB
6	93F0067	Jumper, 2-position (4-pack)
7	92G7432	Video memory kit, 1MB 16 nsec
Not shown	06H4271	Riser card

Rackmount Plates and Handles

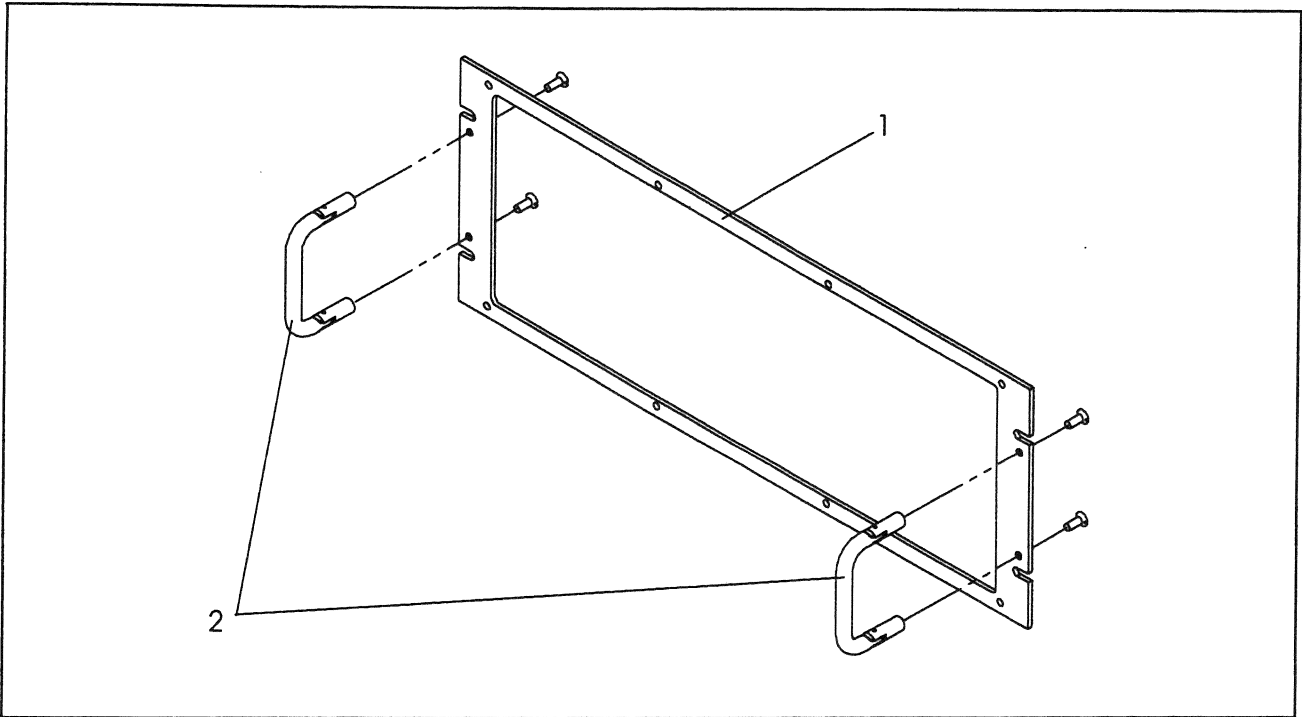


Figure 8-9. Rackmount plates and handles

Table 8-9. Rackmount plates and handles		
Figure Index Number	FRU Part Number	FRU Description
1	—	Rackmount plate with handles
	06H4281 06H4282	Plate for use with slide rails Plate for use without slide rails
2	04G2083	Handles, rackmount (includes 2, with screws)

Index

Numerics

- 25-pin parallel port 4-40
- 5V/3V microprocessor-voltage jumper 4-36
- 9-pin serial port 4-44

A

- adapter card ROM 4-28
- adapters 1-9
- address conflicts 5-9
- application-specific drivers 4-33

B

- battery failure error message 5-14
- battery, replacing 7-9
- baud rate (definition of) 4-44
- bays, drive 1-9
- bezel, drive 1-10
- blank screen 5-7
- broken cover lock 5-8

C

- cable
 - chaining drives with 1-11
 - external drive 1-11
 - internal drive 1-10
 - lengths 1-11
 - SCSI 1-10, 1-11
 - terminators (SCSI) 1-11
- cache configuration information 4-18
- cache memory 1-9
- cache memory modules 8-9
- cache memory modules, replacing 7-11
- cache memory, installing 3-8
- cache-select jumpers (128K/256K) 4-36
- CD ROM drive, replacing 7-19
- CD-ROM drive 1-9
- CD-ROM drives 8-8
- CGA (color graphics adapter) 4-47
- chaining, drive 1-11
- changing jumpers 4-35, C-1
- changing or viewing configuration information 4-10, 4-12, 4-17, 4-24
- character tests 6-22
- clock information, setting 4-16
- code page 4-49
- COM1 4-44
- communications 4-39, 4-44
- configuration
 - device change 5-14

- configuration (*continued*)
 - hardware change 5-13
 - memory change 5-15
 - purpose 2-9, 4-10
 - running 2-9
- Configuration Utility Program 4-10—4-16
- Configuration Utility program, description 5-3
- conflicts, eliminating assignment 5-9
- cover lock, broken 5-8
- creating the error log 6-23

D

- date and time 4-16, 4-33
- detecting POST errors 5-2, 5-4
- device configuration error 5-14
- device drivers E-1
- device records A-1
- diagnostic
 - diskette 5-1
 - error messages 5-3, 5-17
 - tools 5-2
- Diagnostics Diskette 6-17
- dimensions B-1
- direct memory access (DMA) channel
 - assignments 4-34, D-2
- disk drive, hard 1-9
- diskette
 - PS/ValuePoint Diagnostics Type 5 diskette 5-1
 - update 4-50
 - write-protect feature 4-33
 - write-protect jumper (WRITE PROTECT) 4-36, 4-37
- diskette change test 6-20
- diskette drive 1-9
- diskette drive access 4-5
- diskette drive in-use lights 5-6
- diskette write-protect jumper 4-5
- diskette write-protect jumper (WRITE PROTECT) C-2
- display
 - blank screen 5-7
 - distorted screen 5-7
 - error codes 5-4, 5-11
 - jitter 5-7
 - problems 5-7, 5-11
 - rolling screen 5-7
 - self-tests 5-6
 - wavy screen 5-7
- display attributes 6-22
- display the error log 6-23
- displays 1-14
- disposing of batteries 4-38

dma channel assignments 4-34
 DRAM 4-49
 drive
 cables 1-10
 chaining 1-11
 cover plates 1-10
 external 1-9
 IDE 1-10
 installation hardware 1-10
 installing internal 3-12
 internal 1-9
 SCSI 1-10
 sizes 1-9

E

EEPROM, flash 4-12, 4-17, 4-50
 EGA (enhanced graphics adapter) 4-47
 energy saving period 4-22
 enhanced graphics adapter (EGA) 4-47
 error detection and correction 6-21
 error log
 creating the 6-23
 display the 6-23
 errors
 battery failure 5-14
 configuration 4-9
 device configuration 5-14
 diagnostic 5-13, 5-17
 memory configuration 5-15
 messages 5-3, 5-11, 5-13
 POST 5-13
 prompt 5-11
 software 5-12
 expansion slots 1-9

F

fan (power supply) problems 5-8
 feature cards, replacing 7-8
 fixed disk drive 1-9
 flicker 4-47
 forgotten password, removing 4-43
 formatting procedure 6-21
 front access door 4-1
 front fan, replacing 7-21
 FRU Numbers 8-1

G

general problems 5-8
 graphic tests 6-22
 graphics 4-47

H

handling static-sensitive devices 1
 hard disk drive 1-9, 8-7
 bad sector 5-11
 testing 5-11
 hard disk drive menu 6-20
 hard disk drive, replacing 7-18
 hard drive access 4-5
 hardware
 diagnostic error messages 5-17
 problems 5-1
 testing programs 5-1
 head select 6-21
 high-resolution color 4-48

I

icon 6-17
 ID, SCSI 1-10
 IDE controller 1-10
 in-use lights 5-6
 indicator lights problem 5-8
 industry-standard architecture (ISA)-bus adapters D-1
 input/output ports, configuration information 4-18
 installation hardware, drive 1-10
 installation problems
 options 5-9
 power-on 5-10
 installing options 3-1
 intermittent problems 5-8
 internal drive cables 1-10
 interrupt conflicts 5-9
 interrupt request assignments D-1
 ISA video display not working 4-25

K

keyboard 1-13
 keyboard problems 5-9
 kits, installing cache memory module 3-8
 kits, installing RAM memory module 3-6
 kits, installing video memory module 3-10

L

languages 4-49
 LED assembly, replacing 7-23
 LEDs 4-1
 light pen connector 1-13
 lights not working 5-8
 lock 4-5
 lock for cover, broken 5-8
 LPT1 4-39

M

- management, power, configuration information 4-22
- mass storage device configuration information 4-19
- MCGA (multicolor graphics array) 4-47
- memory 1-9
- memory configuration error 5-15
- memory modules 8-9
- memory-retention battery, replacing 4-38
- messages
 - battery failure error 5-14
 - device configuration error 5-14
 - diagnostic error 5-3, 5-13, 5-17
 - error 5-13
 - memory configuration error 5-15
 - POST error 5-3, 5-13
 - screen 5-11
 - software-generated error 5-3
- microprocessor 1-9
- microprocessor-SL jumper
(SL-ENHANCED NON-SL) C-2
- microprocessor-SL jumper (SL-ENHANCED /
NON-SL) 4-36, 4-37
- microprocessor-speed jumpers (25/33/40/50
MHz) 4-36
- microprocessor-upgrade jumper
(DX/DX2/DX4 486SX) C-2
- microprocessor-upgrade jumper
(DX/DX2/DX4/486SX) 4-36, 4-37
- microprocessor-voltage jumper (5V/3V) 4-36
- microprocessor, replacing 7-13
- modem connector 1-13
- mouse connector 1-13
- mouse problems 5-9
- mouse-disable jumper (IRQ12) 4-36, 4-37, C-2

O

- occasional problems 5-8
- on/off switch 4-1
- opening the system unit 7-7
- options 1-9
- options problems 5-9

P

- parallel devices 1-13
- parallel devices, external, installing 4-39
- parallel port mode 4-40
- parts 8-1
- parts warranty 8-1
- password prompt 5-11
- password, power-on 5-4, 5-9
- passwords 4-6
- physical dimensions B-1

- plates, cover 1-10
- pointing devices 1-13
- pointing-device problems 5-9
- port assignment conflicts 5-9
- ports, input/output, configuration information 4-18
- POST 6-17
 - See also* power-on self-test (POST)
- power cord xv, 8-12
- power down timer 4-22
- power management configuration information 4-22
- power management function 4-7
- power supply fan problems 5-8
- power supply, replacing 7-20
- power switch 4-1
- power switch, replacing 7-24
- power-on password 5-4, 5-9
- power-on problems 5-4, 5-10
- power-on self test 6-17
- power-on self-test (POST)
 - battery failure error 5-14
 - description 5-2
 - error 4-10
 - error detection 5-2, 5-4
 - error messages 5-3, 5-13
 - operation 5-2, 5-4
 - updating 4-50
- printer problems 5-11
- printers, SCSI 1-10
- problems
 - diskette 5-6
 - diskette drive 5-6
 - display 5-7
 - error prompt 5-11
 - fan 5-8
 - forgotten power-on password 5-9
 - hardware 5-1
 - intermittent 5-8
 - keyboard 5-9
 - mouse 5-9
 - no beep 5-7
 - occasional 5-8
 - only cursor appears 5-8
 - options 5-9
 - overview 5-1
 - password prompt 5-11
 - pointing-device 5-9
 - power-on 5-4, 5-10
 - printer 5-11
 - screen distortion 5-7
 - screen jitter 5-7
 - screen roll 5-7
 - software 5-1, 5-12
 - solving 5-4
 - user error 5-1
 - wrong number of beeps 5-7
 - wrong screen characters 5-8

program
 Configuration Utility 5-3
 diagnostic 5-3, 5-5
 power-on self-test (POST) 5-2
 utility 4-10

prompt
 error 5-11
 password 5-11

R

rails, drive 1-10
 RAM 1-9
 RAM memory modules, replacing 7-10
 read verify 6-21
 rear fan, replacing 7-22
 records, device A-1
 refresh rate 4-12
 replacement parts 8-1
 replacing a memory-retention battery 4-38
 resolution 4-47
 restore configuration 4-10
 riser card, replacing 7-14
 riser-select jumpers (VESA PCI) C-2
 riser-select jumpers (VESA/PCI) 4-36, 4-37
 ROM (read-only memory) 4-50
 ROM shadowed in RAM 4-24
 running the Configuration Utility program 2-9

S

scanners, SCSI 1-10
 screen
 blank 5-7
 Diagnostics diskette Main Menu 5-5
 messages 5-11
 screen paging 6-22
 SCSI 1-11
 chaining drives 1-11
 terminators 1-11
 security features 4-5
 security information 4-14
 seek test 6-20, 6-21
 self-tests, internal 5-2, 5-4
 serial devices 1-13
 serial devices, external, installing 4-45
 service parts warranty 8-1
 SIMMs 8-9
 SIMMs, installing 3-6
 sizes, drive 1-9
 slide, drive 1-10
 software
 errors 5-12
 problems 5-1, 5-4
 speaker, replacing 7-25

special characters 4-49
 specifications 1-7
 speed test 6-20
 start mode, unattended 4-21
 starting the
 computer 5-4
 diagnostic programs 5-5
 static-sensitive devices, handling 1
 storage device, mass, configuration information 4-19
 SVGA 4-47—4-49
 SVGA device drivers E-1
 switch, on/off 4-1
 switch, power 4-1
 switch, voltage-selection 5-4
 sync test 6-22
 system board 8-9
 system board, replacing 7-15
 System Information 4-12
 system memory combinations 3-6
 system programs 4-50
 system unit, opening the 7-7

T

terminators 1-11
 test programs, hardware 5-1
 test the system program
 description 5-3
 files location 5-5
 running 5-5
 testing the
 character 6-22
 computer 5-4, 5-5
 diskette change 6-20
 display 5-6
 error detection and correction 6-21
 graphics 6-22
 read verify 6-21
 screen paging 6-22
 seek 6-21
 speed 6-20
 verify diskette 6-20
 VGA 6-22
 write, read, compare 6-20
 time and date 4-16, 4-33
 tools, diagnostic 5-2
 trackball connector 1-13
 transferring data 4-39
 tray, drive 1-10
 troubleshooting charts
 description 5-3
 diskette drive 5-6
 display 5-7
 forgotten power-on password 5-9
 general problems 5-8
 intermittent problems 5-8



TNL SN28-9752-00



Printed in the United States of America
on recycled paper containing 10%
recovered post-consumer fiber

SN28-9752-00

